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GRAVITY WATER SUPPLY FOR THE CITY OF MANILA, P. I.

VOL. II: No. 4. MANILA AND SHANGHAI, SEPTEMBER, 1905

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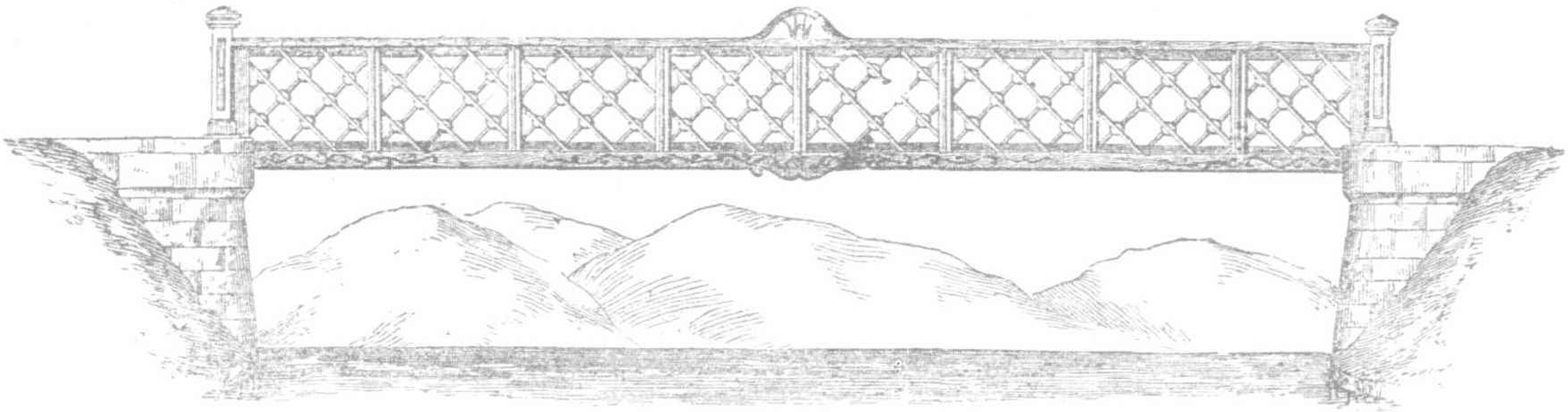

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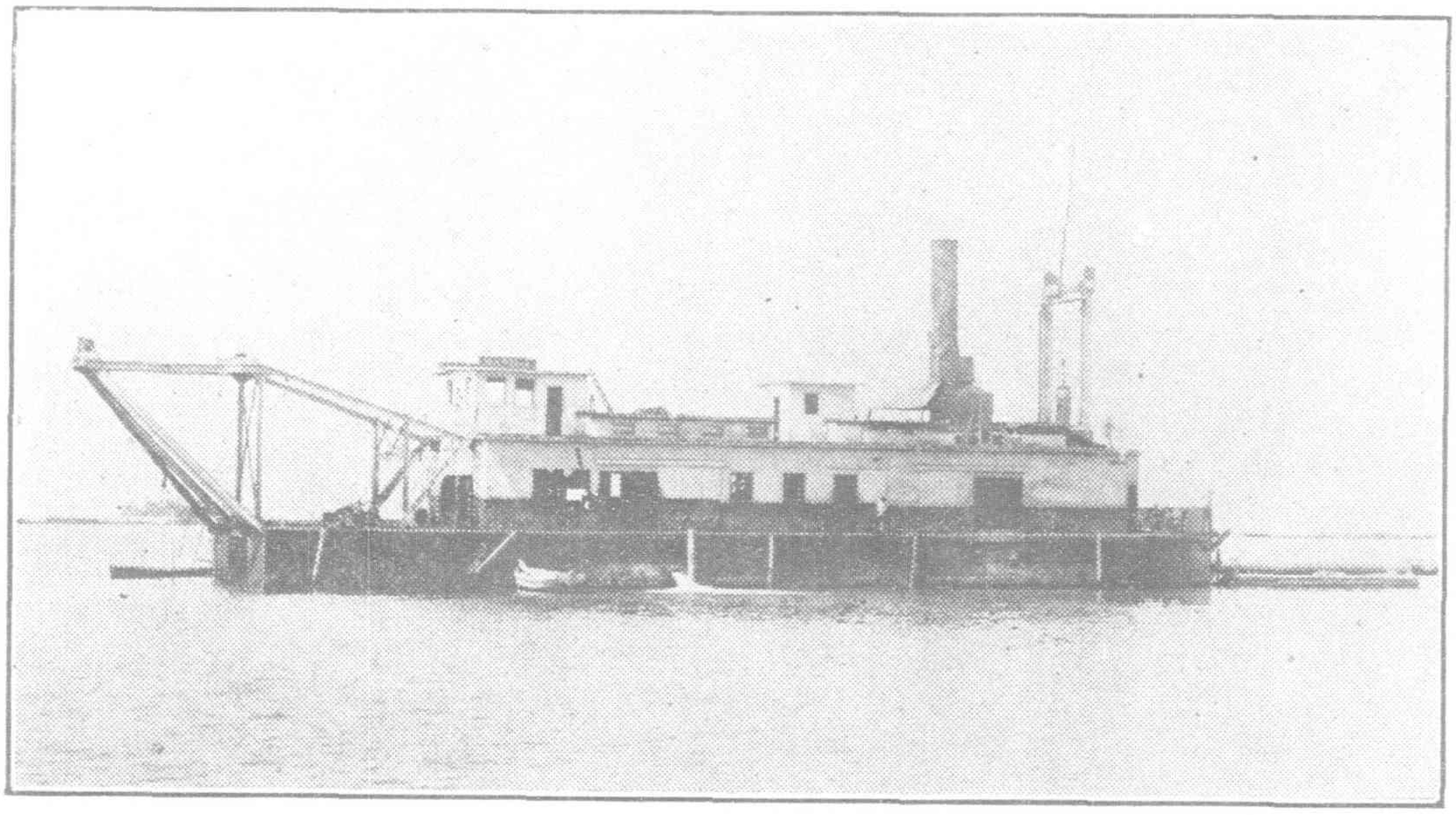

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FAR EASTERN REVIEW
COMMERCE ⊛ ENGINEERING ⊛ FINANCE

VOL. II. MANILA, P. I., SEPTEMBER, 1905. No. 4.

SIR THOMAS JACKSON, BART.
(See page 91.)

FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

A MONTHLY REVIEW OF FAR EASTERN TRADE, FINANCE, AND ENGINEERING. DEDICATED TO THE INDUSTRIAL DEVELOPMENT AND ADVANCEMENT OF TRADE IN THE PHILIPPINES AND FAR EASTERN COUNTRIES.

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MANILA AND SHANGHAI, SEPTEMBER, 1905

JAPAN'S ELECTRICAL DEVELOPMENT.

Singular scientific perfection is apparent in Japan's internal and economic workings despite the turbulence and bloody struggles of the war through which this wonderfully progressive empire has just passed. The intelligent application of the knowledge of the western world has left its imprint upon Old Japan.

The modernness of Tokyo has amazed the traveler. Trolley cars, telephones, telegraphs and electric lights abound. The central stations of Japan exhibit the newness of our own. The agents of this extraordinary nation are in every civilized land on the globe, procuring information and devices suitable to her development. Electrical papers have been published for many years in pure Japanese. Science and its most practical undertakings have been the sign posts along the national road to success. Motor and dynamo building plants are being established, and the pulse and beat of the entire nation, in a commercial and industrial sense, partakes of the character of its western teachers.

Water power abounds in many places in Japan, and coal crops out from the soil with every evidence of plentitude. To some extent these natural resources have been utilized; perhaps to an extent which seems limited. Yet considering the accomplishments in other directions, as intense an activity will be manifested in the near future in regard to electrical central stations, their increased capacity and duplication.

The present consumption by Japan of lamps, wire, dynamo, electric machinery, and a hundred other electrical accessories, indicates the future growth of an extensive business in such supplies. She is building her trolley roads and constructing and equipping her central stations in a solid and permanent manner. When her affairs are settled by the restoration of peace, we are bound to hear more of the electrical development of Japan. The future of the trolley and necessarily of the central station in this country is very bright. Japanese electrical engineers are looking out for that. They are also taking in the points of interest, in connection with all electrical enterprises in other countries. It is only to be expected, therefore, that electricity will become as useful and as general a servant to the Japanese as to the western people.

Tokyo and Yokohama are very much up-to-date at this writing. What will be done in Manchuria will be best known after peace is reestablished. With resources like those of the United States there is every possibility that here the manipulations of the electrician will transform the cities and outlying districts into scenes of bustle and activity. If precedent counts for anything, it will show how Japan and the new province over which her influence must dominate will grow, more by reference to America than perhaps any nation on the face of the globe.

The Philippines are destined to be the connecting link between the United States and Japan. In these new possessions of ours electrical enterprises are rapidly growing. Japan has not very far to come to study the results of a few years of American influence in these Islands. What she has and will accomplish herself is not difficult to imagine. The lighting of the large Japanese cities is almost entirely in the hands of the new generation, and the central station has become a fixed feature of Japanese life.

WATERWHEEL SYSTEM OF POWER.

Water power for industrial purposes seems to be developing under a strong impetus throughout the Orient. While little attention has been given to this natural force in the Philippine Islands, there are many possibilities here for the utilization of water for mining and manufacturing purposes, and with our own industrial progress it seems certain that water power will be an important element in the establishment of factories and the opening up of the milling and mining resources of the Islands, as well as in the installation of electric lighting and power throughout the provinces.

Enormous strides in electrical power transmission, with which water as a propelling force is so closely allied, have made possible the development of forces which are far removed from the point of application, with the result that the utilization of the modern waterwheel and the demand for it, are on the increase.

In this connection it is interesting to note the high degree of perfection which the modern waterwheel has attained. American wheels seem to have become a distinct science in themselves, and on account of the perfection to which they have been raised they are rapidly becoming standard the world over.

It is conceded that electric transmission of energy is now the most important factor in the industrial field of the Orient, where everything in the way of machinery that is most modern and economical is in demand. Development on this line is just now phenomenal in the Far East, and the achievements throughout the Orient can scarcely be credited from the standpoint of a few years ago in other parts of the world.

The first successful experiment in long-distance electric transmission was made in Germany in 1891, where a small amount of power was transmitted from Lauffin to Frankfort, and used in connection with an industrial exposition held there at the time. In less than a year thereafter a Pelton waterwheel, which is manufactured in San Francisco, was driving a generator at the plant of the San Antonio Light and Power Company, in Pomora, Cal., and transmitting electricity for power and light a distance of forty-five m. This was the first real commercially operative system of electric transmission that was ever installed.

The development was rapid from this time on, with the result that today a transmission of 100 m. is of quite common occurrence, and thousands of h. p. are being transmitted for a distance of nearly 300 m. It has been demonstrated that the limit of distance to which power can be economically transmitted depends solely on the cost of the line conductors; hence, it is difficult to forecast the development which is to come. And with water as the motive force, under all ordinary conditions electricity is conceded to be the most economical and reliable power known.

As an illustration of the increasing demand for waterwheels it is noted that in electrical plants alone there are 326 stations aggregating 283,000 h. p. in Pelton wheels, and in this number are represented plants in Japan, China, the Hawaiian Islands, India, Malaysia, and Australasia. In these countries electrical development is assuming remarkable proportions, and while it can not be stated that water power is the system most in demand, where utilization is practicable the waterwheel is commanding full consideration.

ANOTHER GREAT TRADE ROUTE.

The completion of the railroad now under construction across the Isthmus of Tehauntepec, in Mexico, will herald the appearance of another great factor for the carrying trade of the Pacific. The railroad is being rapidly completed by the great engineering firm of Messrs. S. Pearson & Sons, Ltd., of London, the managing directors of the Tehauntepec Railroad Company, who hold the concession from the Mexican Government, and the line is expected to be open to traffic by the latter part of next year.

The American-Hawaiian Steamship Company, operating a line of steamers between New York, Seattle, and the Hawaiian Islands, has just closed a contract with Messrs. Pearson & Sons for the transportation of all the freight carried by the steamers between Atlantic and Pacific ports on the completion of the road. The steamship company controls the bulk of the sugar shipments from Hawaii to the United States, having in completion a fleet of nine steamers with a total cargo capacity of 75,000 tons, and has recently ordered from the Union Iron Works, of San Francisco, two additional freight steamers of 12,000 tons cargo capacity each, representing an outlay of over $2,000,000 gold. The speed will be 12 knots and the boilers will be equipped for burning oil.

With the opening of the railroad across the isthmus, and the shortening of the trade route to New York, it would release some of the steamers, and with favorable rates the company may be expected to extend its lines to the Far East.

MANUFACTURING DEVELOPMENT.

The awarding of the contract for two large freight steamers to the Union Iron Works, at San Francisco, marks a revival of the industry on the Pacific seaboard. Secured in the face of keen competition from the eastern shipbuilders, it is indicative of the ability of the West to cope with the rapid change in conditions which lost some of the larger work in the last two years. The slack period was utilized in enlarging and increasing the facilities of the plants, and again the future holds out bright prospects.

The rapid growth of Oriental trade calls for the construction of many new ships, and the signs point to the fact that the western shipbuilders, with characteristic confidence in the future, are determined that the work will be done at home.

On a par with this aggressive spirit, is the enterprise displayed by the Honolulu Iron Works. Far distant from the source of raw material, compelled to carry enormous stocks to escape the delays in transportation and delivery, this company has forged ahead to a position unrivalled by any similar concern in its line of business. With the establishment of the most modern engineering plant West of the Mississippi River, the works were able to fully meet all the local demands for heavy sugar machinery, establishing a record for the efficiency of their mills. With slack business in the Hawaiian Islands, the company has turned around and is now competing for the trade in Mexico, Cuba, and Louisiana. Offices have been opened in New York with this object in view, and at an early date a similar office will be opened in Manila, anticipating the revival of the sugar industry in the Philippines, and to be in close touch with the large estates of Java and the East Indies.

MINERALS OF THE PHILIPPINES

The last annual report of the Mining Bureau of the Philippine Government, recently issued by Mr. H. D. McCaskey, chief of the bureau, is a concise and interesting statement of the mineral resources of these islands, based as it is on the field work done by the bureau, on statements of explorers and prospectors, and on the best work of the Spanish authorities. All the information up to date is comprehensively summarized.

According to the report gold has been found in almost every island of importance in the archipelago. It has been worked by natives in placers and in stringers from time immemorial, and the total production of the islands must have been considerable indeed, although no reliable statistics have ever been kept. The manager of one of the local banks is authority for the statement that at one time a great deal of nugget and other alluvial gold was received at the bank. Richard von Drasche, a German geologist who has done some field-work in the islands and has published important papers upon Philippine geology, states that at the time of his visit to Mambulao and Paracale (Camarines province) there were over 700 natives working the placer deposits for gold. It was estimated by a Spanish governor of Manila of the seventeenth century that the annual output of gold from Camarines Norte was about $200,000. This seems well within possibility and is an indication of what was yielded to native methods. The natives in no part of the islands have been able to dredge or sluice, nor have they penetrated more than 50 or 100 ft. into the rock at any place. Abella states, in his 'Ligera Reseña de la Minera de las Islas Filipinas,' that from 3,000 to 4,000 pesos worth of gold was taken annually from the streams in the mountains of Bulacan near Santa Maria de Pandi. This statement has not appeared elsewhere, to the knowledge of this Bureau, and it is not known upon what information it is based. It is believed, however, that a great deal of placer gold has been obtained in the past by natives of Bulacan. It has been estimated by Centeno (1876) that the placer output of the Misamis and Pigtao fields in northern Mindanao has been, in the hands of the natives, about $27,000 per annum; and William Asburner, an American mining engineer, states that he was informed that $20,000 worth of gold had been taken by natives from the placer fields of Surigao, in northern Mindanao, in 1882. No figures are yet available from Benguet or Lepanto, but a prominent mining engineer recently stated that during his visit last year in Benguet two American miners obtained 20 lbs. of gold from rich stringers in seven days. It is known that some of these stringers worked by the natives have been enormously rich. The greater number of the richer placers readily accessible to man have probably been pretty thoroughly worked over from the surface, but it is known that the natives, and Spaniards also, have seldom gone to bedrock.

From the Pigholugan region, in northern Mindanao, J. Clayton Nichols, an American mining engineer, states that he was informed that $4,000 was taken from one hole and $2,500 from another. In the northern part of Masbate, near Arroroy, three American mining companies have recently staked out and recorded a large number of placer and lode claims, and work is going on upon these at the present time. It is understood that an American consulting engineer who has recently visited and reported upon this field was favorably impressed with the outlook for mining the alluvial gold in that region. A number of placer claims have also recently been staked and recorded by Americans in the head waters of the San Mateo river, in Rizal. In the Pigtao region of northern Mindanao, Mr. Nichols estimates the value of the gravels to be from 15 to 25c. to the cubic yard, in such quantity as to suggest the careful study of that field with respect to the use of the steam dredge.

In addition to the districts mentioned above, gold has been worked to a greater or less extent by the natives in Fidelisan, Bontoc province; Suyoc, Dugon and Tuboc, Lepanto province; Acupan, Tabio, Capunga and Itogas, Benguet province; Capan and Peñaranda, Nueva Ecija province; the islands of Polillo and Catanduanes, Labo, Capalongan and Maculabo, in the Camarines; Atimonan, in Tayábas; and in Cebu, Panay, Samar and Panaon.

The gold from Benguet, Lepanto, Surigao and Misamis has been found largely in small seams or stringers in quartz, although true veins have been found in all of these districts save the last. The most promising veins from Mambulao and Paracale are reported to be contact veins between gneiss and diorite. The best-defined veins appear to be entirely in the older crystalline rocks; those of the Camarines and Masbate notably so. Assay values of many veins sampled throughout the islands by prospectors and miners vary between a few cents to several hundred dollars to the ton. As it is not known by what method the samples were taken, a table of assay returns is not presented here. Suffice it to state that from present knowledge there are well-defined veins, of sufficient width and assay value, so far sampled in Lepanto, Benguet, the Camarines, and Masbate, to justify extensive development work, and that such work is now in prospect of performance upon claims in these districts.

The above notes apply to placer or free-milling gold. There are deposits of low-grade, free-milling, and partially or wholly refractory ores in Lepanto and Benguet that have not yet received the investigation they deserve. Miners and prospectors have devoted their energies during the past four years entirely to the most promising fields so far found.

It is believed, from present information, that there is a future for hydraulic and dredge alluvial mining in the Camarines, in Masbate and in Mindanao, and for vein mining in Lepanto, Benguet, the Camarines, Masbate and Mindanao. Later and more detailed information must necessarily depend upon development work now in progress, and it is hoped that future work will extend rather than diminish the list given above.

The majority of Philippine gold ores now being worked are crushing and amalgamating ores; a few must be smelted, and cyanide plants will probably be erected for many of the works. Associated with the gold in some of the Camarines ores are the sulphides of iron and copper in the form of pyrites, zinc in sphalerite, and crocoite, the chromate of lead. Gold is also found associated with the sulphides, arsenides and antimonides of copper in the mines of Lepanto, district of Mancayan.

Copper has been reported from the islands of Luzon, Mindoro, Masbate, Panay and Mindanao; but the only important deposits so far known are those of the famous district of Mancayan, Lepanto province, in northern Luzon. The report of copper in the island of Balabac, the Paragua group, could not be verified by the mining engineer of this Bureau in a recent visit by him to that island; and Abella could find no evidence of valuable copper deposits among those reported from Panay. Samples of native copper, said to have been brought from Masbate, have been shown to the present chief of the bureau, but no information of value was obtained from the prospector exhibiting them. The copper deposits so far known in Mindoro are all of copper pyrite, apparently of limited extent; and of the ores reported from Mindanao, nothing is known. There are veins of chalcopyrite in the Camarines and in Bontoc, but they have not yet been prospected or developed, and data concerning them are not available at the present time.

The important deposits of Lepanto are at Suyoc and Mancayan, within a few miles of each other, in the southern part of the province. These veins carry the sulphides, arsenides and antimonides of copper, among them enargite, and its variety first identified here, luzonite. From samples obtained in the breasts of old workings at Mancayan, it has been estimated that the ores average 16% in copper, with a gangue of quartz. There is much of this ore in sight, and it is believed that in quantity and quality of copper, Mancayan is one of the most inviting of the mineral assets of the Philippines. The deposits have been prospected, staked and recorded, and the owners of claims are sanguine of success.

The working and smelting of the ores of Mancayan were carried on by the Igorrotes of Lepanto before the Spanish conquest. The metallurgical treatment was so ingenious, complicated and effective, that it unquestionably points back to an older contact with civilization, probably with the Chinese from the north. The mining, of course, has been most avaricious, and the old workings will require thorough timbering before modern methods of exploitation can be employed. Of the many interesting features of the Igorrote metallurgy and of the first Spanish invasion of Mancayan nothing will be given here, save that the natives made such excellent implements and utensils of copper, exporting them to the extent of 200 tons annually, that the attention of the Spanish was attracted; and that after an invasion with an armed force as an escort, amicable arrangements were finally made between the Canabro-Filipino Mining Company and the Igorrotes, by which mines were opened and worked under the distinguished Spanish inspector of mines, José Maria Santos, and that from two mines for the 10 years following 1864 about 1,100 tons of copper were annually produced. Upon the death of Santos, who made a success of the Mancayan, mining was stopped.

It is hoped that as a result of field-work, recently completed in Lepanto by a party from the bureau under A. J. Eveland, geologist, a fairly complete bulletin upon this interesting subject may soon be in press.

Capt. McCaskey's conclusions are summed up as follows: "Although some of the common metals are absent, or not yet discovered, in the Philippines, there remain sufficient mineral resources to form the basis of an important industry. The stage at present is that of investigation and development; it is hoped, however, that we shall rapidly approach the period of production.

"Further development of the mineral resources of these islands is necessary to growth of the industries involved. Prospecting has been done upon almost every island of the group, to the great credit of the pioneers who have laboriously blazed the trail; but capital for the development of prospects has been difficult to secure. It is hoped that the definite policy concerning the future of these islands, so earnestly desired by capitalists as a pre-requisite to permanenet investment, may soon be determined by the people of the United States, to the end that the Philippines may enter upon an undisturbed and prosperous career."

REVIEW

"Pelton Water Wheels," The Pelton Water Wheel Company, San Francisco and New York City; 10th edition.

This is a magnificently illustrated catalogue of the Pelton system of power, and explains to the uninitiated in water wheel practice, as concisely as possible, the primary principles and general functions of the Pelton Wheel; also indicates its ready application to a variety of conditions.

GRAVITY WATER SUPPLY FOR THE CITY OF MANILA, P. I.

(J. F. CASE, C. E., Chief Engineer.)

According to the specifications which are to govern the construction of the Gravity Water Supply for the City of Manila (see advertisement in another section of this paper), the work called for will preferably be let as a whole, but may be let separately in the following divisions if deemed advantageous to the municipality—

Dam and head works, one contract.

Furnishing steel plates and rivets, one contract.

Manufacture and laying of steel pipes, one contract.

Tunnel and conduit, one contract.

Reservoir and gatehouse, one contract.

All bids will be compared on the basis of the engineer's estimate of quantities of work to be done, which, subject to change, is as herewith shown:—

DAM.

Item 1.	Earth excavation, Class A........cubic yards	1,000
2.	Earth excavation, Class B.........cubic yards	500
3.	Loose-rock excavation, Class C.........cubic yards	1,600
4.	Loose-rock excavation, Class D.........cubic yards	400
5.	Solid-rock excavation, Class E.........cubic yards	11,000
6.	Solid-rock excavation, Class F.........cubic yards	500
7.	Solid-rock excavation, without blasting, Class G.........cubic yards	500
8.	Rubble concrete masonry..........cubic yards	23,000
9.	Facework of rubble concrete masonry square yards	3,600
10.	Riprap..........cubic yards	1,200
11.	Portland cement concrete masonry, 1:2½:5..........cubic yards	300
*12.	Concrete gate well lining..........cubic yards	206
*13.	Brick masonry gate well lining.........cubic yards	206
14.	Gatehouse at dam, one complete	
15.	Hauling, caring for, and placing iron and other metal work..........tons	45

FURNISHING STEEL PLATES AND RIVETS

16.	Steel plates..........pounds	5,300,000
17.	Steel rivets..........do........	155,000

MANUFACTURING AND LAYING STEEL PIPE.

18.	Earth excavation and refilling..........cubic yards	58,500
19.	Loose-rock excavation and refilling..cubic yards	1,000
20.	Solid-rock excavation and refilling....cubic yards	9,000
21.	Adobe-stone excavation and refilling cubic yards	7,500
22.	Manufacturing, laying, transporting and testing 42-inch steel pipe........lineal feet	55,800
23.	Furnishing, transporting, laying, and testing 36-inch cast-iron pipe under the Mariquina River....lineal feet....	450
24	Furnishing and laying 6-inch waste pipe, No 14 Birmingham wire gauge..........lineal feet....	1,000
25.	Portland cement concrete masonry 1:2½:5....cubic yards.	200
26	Portland cement concrete masonry composed of 1 part cement, 4 parts sand, 10 parts broken stone, cubic yards	150

TUNNEL.

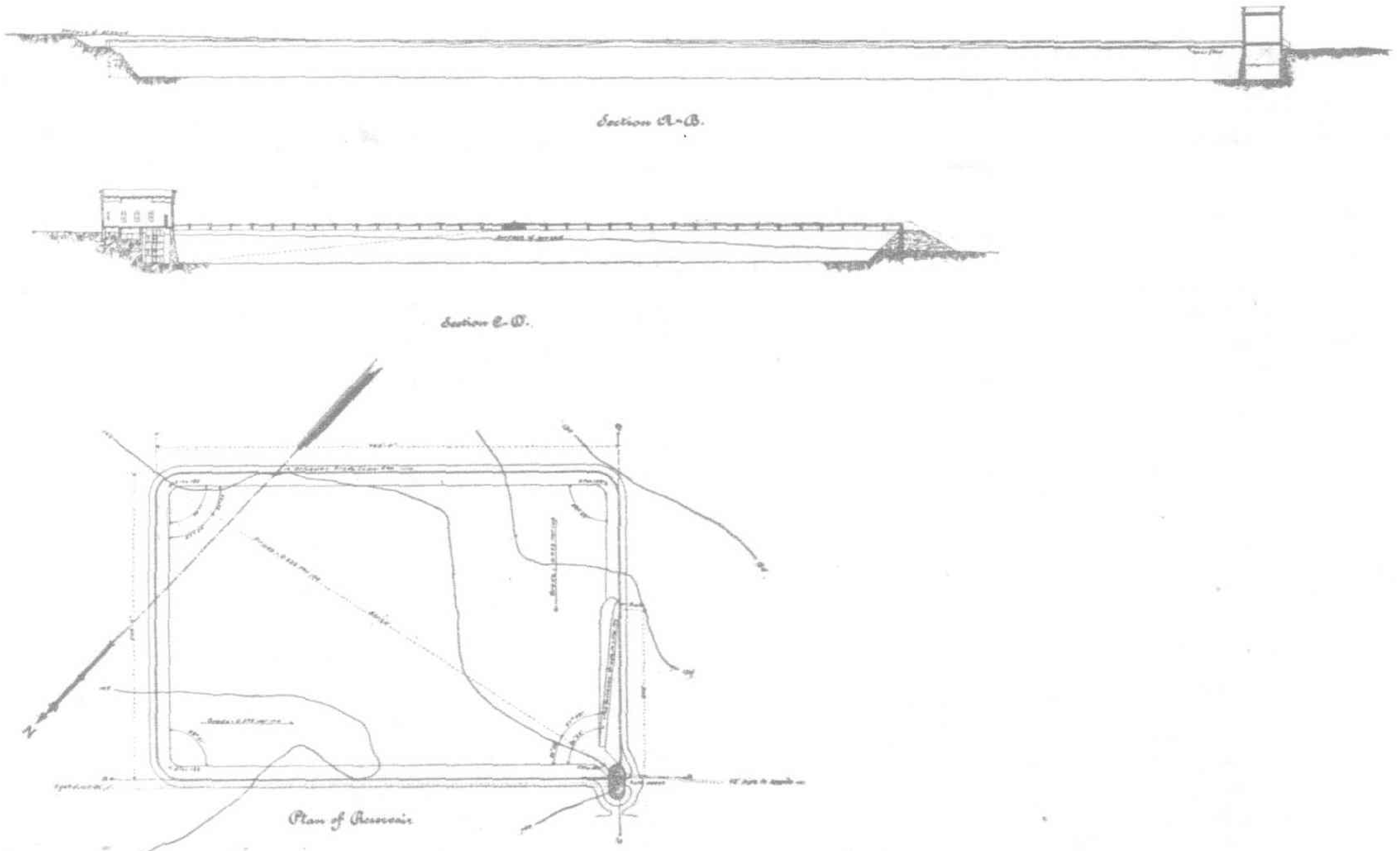
27.	Earth excavation in open trench.......cubic yards	1,050
28.	Borrowed earth for embankment......cubic yards	16,000
29.	Rock excavation in open trench........cubic yards	2,400
30.	Tunnel excavation..........cubic yards	17,500
31.	Concrete lining for tunnel..........cubic yards	3,500
32.	Plaster coat on unlined sections........square yards	37,500
33.	Concrete masonry for chambers, culverts, etc..........cubic yards	270

RESERVOIR AND GATEHOUSE.

34.	Earth excavation..........cubic yards	29,000
35.	Rock excavation..........cubic yards	235,000
36.	Plaster coat for reservoir........square yards	43,500
37.	Concrete masonry lining..........cubic yards	200
38.	Concrete masonry in parapet walls..cubic yards	325
39.	Concrete masonry in gate chambers and core walls.........cubic yards....	1,650
40.	Gatehouse at reservoir, one complete.	
41.	Hauling, caring for, and building into place iron and other metal work in gatehouse and reservoir....tons	41

*Items 12 and 13 are optional with the engineer.

DAM.—The dam is to be built across the Mariquina River, about 3 miles above the town of Montalbon, Province of Rizal, and about 16 miles northeast of Manila. The location and general character of the work are shown on an accompanying plan. The dam is to be built of rubble concrete masonry resting upon the solid rock. The engineer calls special attention to the uncertainly as to the exact quantity of the rock to be excavated in preparing the foundations for the dam, since it will depend upon the character of the rock and the number of seams and other defects, which can not be determined in advance. The quantity of masonry to be built will also vary from that estimated for the same reason. In estimating it has been assumed that the average depth of excavation will not exceed 20 ft., but an increase or decrease in depth will not be regarded as ground for an increase or decrease in prices for rock excavation nor for masonry, or in time allowed for completion of work. The dam will have a length of about 400 ft. on the crest, and its maximum height above the bed of the stream is approximately 75 ft. The central portion, 160 ft. in width, will be built as an overflow or wasteweir section, with its crest 15 ft. lower than the remainder of the dam. On the south side of the overflow a gate chamber is to be constructed, serving an inlet well, sluiceway and supply pipe. The sluiceway and supply pipe are to extend through the dam. Owing to the rainfall during the months from June to November, inclusive, and the consequent stage of the river, it is expected that a greater part of the work of constructing the dam will be confined to the dry season, from December to May, inclusive. In connection with the construction of the dam the contractor will be required to construct and maintain such temporary dams, flumes, dikes, etc., as shall be needed to protect the work and control the water of the stream during construction, and shall do all draining and pumping necessary for keeping the work free from water,



GRAVITY WATER SUPPLY.—PLAN AND ELEVATION OF RESERVOIR and shall, on completion of the work, remove all temporary or protecting works as shall be ordered by the engineer. The contractor will receive no payment for this temporary and protecting work.

EXCAVATION.—In making the excavation required to prepare the foundation for the dam, etc., the contractor will be required to prepare and construct the bed for all pipes, conduits, etc., for a distance of 100 ft. below the toe of the dam. He will first excavate in the bottom of the gorge with a view to uncovering the rock and creating the plane upon which the dam shall rest. The work will be so staked out that a slope of 1½ horizontal to 1 vertical in earth excavation will reach the rock 15 ft. upstream from the heel or upstream face of the dam, and 10 ft. downstream from the toe or downstream face. All rock excavation will be staked out with a slope of 1 horizontal to 10 vertical. Wherever a core wall is necessary a trench therefor will be excavated and if it be necessary to excavate to greater depths than contemplated, all materials below the plane of 158 ft., as shown on the plans and profiles, which plane is approximately 20 ft. below the bed of the stream at the upstream face of the dam, will be classed as "deeper excavation," and be paid for at stipulated prices. Excavation will be classified for estimate and payment as follows:—

Class A: Includes earth, gravel, sand, loam, or stones not exceeding 1 cub. ft. in volume above the plane of 158 ft.

Class B: Same materials as Class A, but below the plane of 158 ft.

Class C: Loose rock and boulders when lying above the plane of 158 ft., not less than 1 cub. ft. nor more than 6 cub. ft. in volume when in masses, but when isolated or scattered in small quantities they will be classed as earth.

Class D: Same material as Class C, but lying below the plane of 158 ft.

Class E: Solid rock in place and boulders more than 6 cub. ft. lying above the plane of 158 ft.

Class F: Same materials as Class E, but lying below the plane of 158 ft.

Class G: Solid rock, when directed by the engineer, will be removed without blasting. This class will only occur in the bottom of the excavation or where there is danger of loosening large masses of adjoining rock. The rock to be excavated is a hard, compact limestone, as far as can be determined.

All trenches and other excavations outside of finished lines of masonry will be refilled with selected materials, and, whenever in the opinion of the engineer it shall be necessary to protect refilled sections or any embankments from the action of the water, the contractor will be required, without extra charge therefor, to deposit suitable rock as a layer of riprap upon the surfaces so needing protection. Riprap will be in sizes from quarry spalls up to stones of not more than one cubic foot in volume and will be hand placed to such thickness as shall be directed.

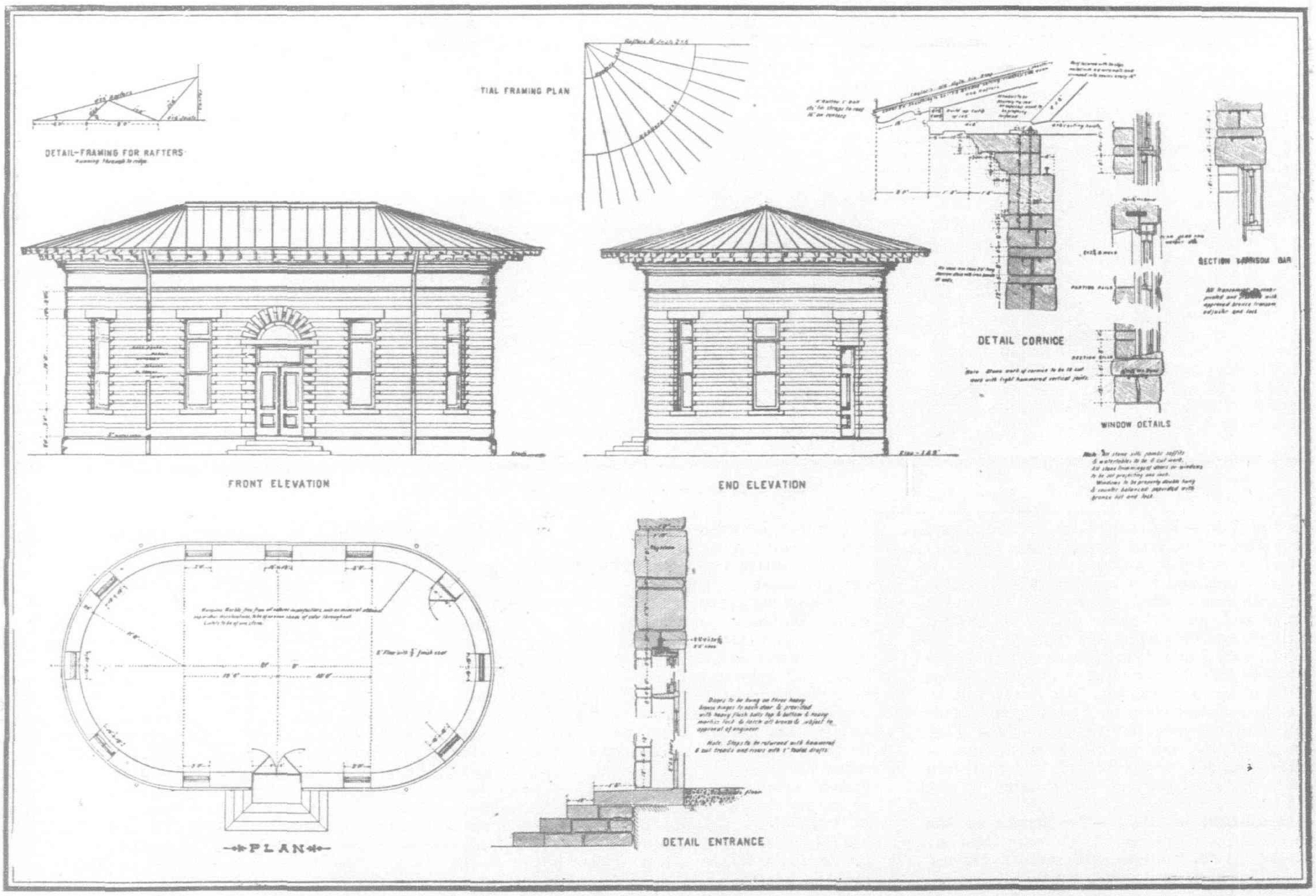
CEMENT.—Only the best grade of imported hydraulic Portland cement will be used in the construction and must conform in all respects to the requirements of the United States Army engineers' specifications for cement. The sand used for concrete, mortar, etc., may be taken from the bed of the Mariquina River adjoining the site of the dam and upstream therefrom, and the gravel may also be obtained at or near the site of the work. Cement will be measured as if compacted, so that 375 lbs. of cement will be considered to have a volume of 3.6 cub. ft., and sand and stone or gravel will be measured when not compacted more closely than by throwing them in the usual way into a barrel or box.

RUBBLE CONCRETE.—The hearting of the entire dam will be built of so-called rubble concrete. It is intended that the entire mass shall contain from 40 to 50 per cent, or even more, of large stone. The contractor will be required to furnish the plant for and to handle stone up to five tons in weight, and will not be limited as to stones of larger size.

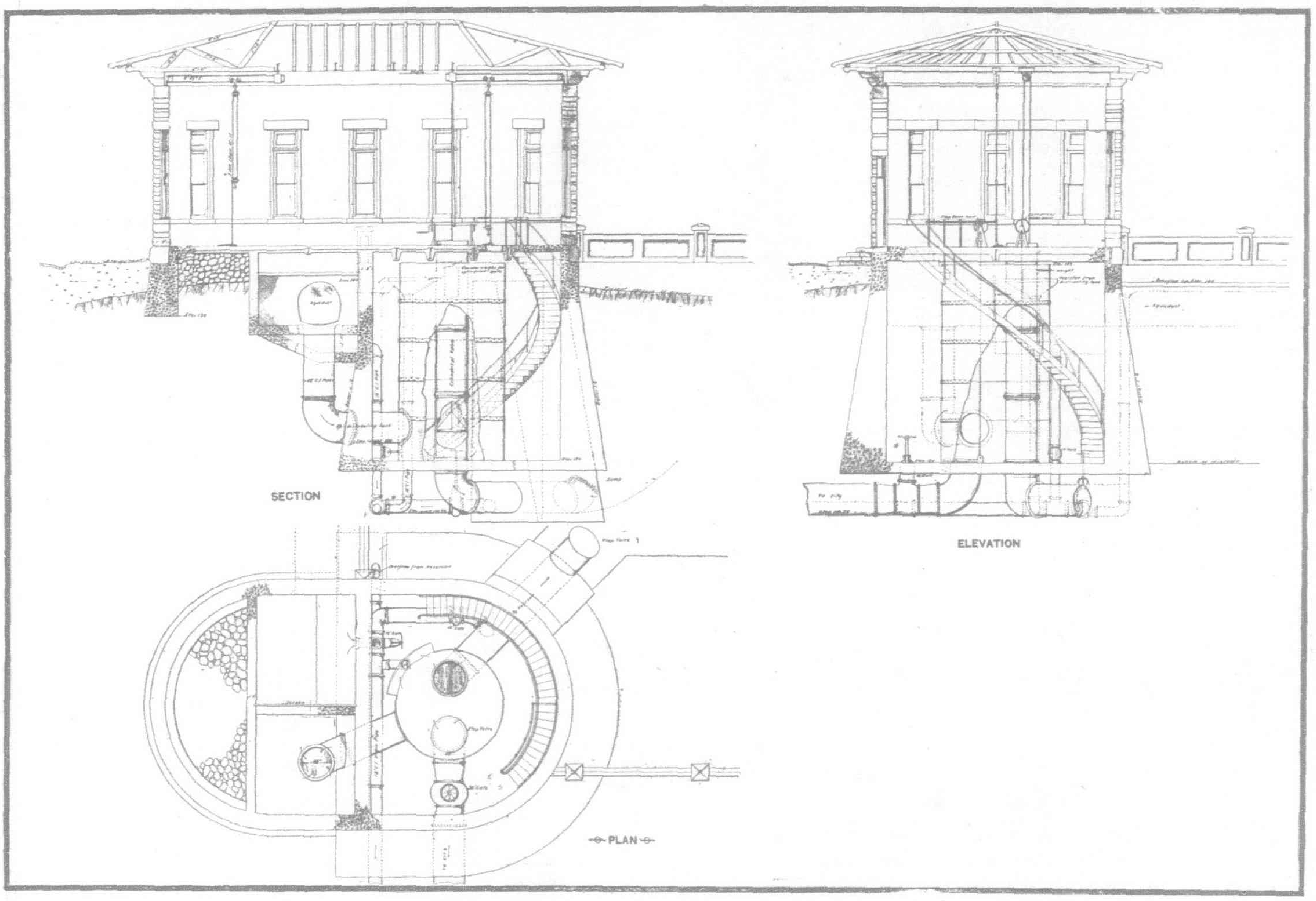
The upstream, top, and downstream faces of the dam will be built of coursed-rubble laid with stone dressed to make ¾ in. joints, for at least 4 in. in depth. After laying, these joints will be raked out to a depth of 2 in. and pointed with mortar consisting of 1 part cement and 1 part sand. Special care will be taken to secure thorough bonding between the hearting and facing, and a sufficient quantity of headers not less than 4 ft. long will be used. The top of the overflow section will be laid and rough-dressed to conform as nearly as possible to the curve shown on the plans. All facework will be paid for by the sq. yd. of superficial area in addition to the price paid per cub. yd. for rubble concrete masonry.

GATEHOUSE, INLETS, ETC.—The gatehouse will be built of coursed-rubble masonry and will be considered as being founded on elevation 255 ft. All work below this elevation will be included in payments for the dam and the work above this elevation will be included in the gatehouse, which latter structure will be paid for as a lump-sum price for the structure complete. Inlets, gate wells, etc., will be built of concrete or brickwork. If of concrete, it will be composed of 1 part cement, 2 parts sand, and 4 parts broken stone, and will be neatly and thoroughly plastered after removing the forms with mortar composed of 1 part cement and 1 part sand. If of brickwork, the brick will be of the best quality of hard-burned bricks, and will be laid with a mortar composed of 1 part of cement and 1 part of sand.

IRONWORK.—The City of Manila will furnish all iron and other metal work required for permanent use in the dam and its appurtenances, and the principal items of iron or metal work to be placed by the contractor are pipes through main dam; pipes, valves, and gates of various sizes in gate chambers; stop plank and screen grooves; pipes for floating gauges, thimbles, or collars; *iron-frame gratings*; flashboard standards; iron boxes over wells in gatehouse; columns and beams in gatehouse; stairs and ladders in gatehouse; anchors for coping stones, and metal roofing.



GRAVITY WATER SUPPLY.—GATEHOUSE AT RESERVOIR.



GRAVITY WATER SUPPLY.—GATECHAMBER AT RESERVOIR.

STEEL PIPE.—Plates will be of soft open-hearth steel and will not contain more than 0.05 per cent phosphorus, 0.05 per cent sulphur, 0.05 per cent silica, and 0.05 per cent of manganese. They will have a tensile strength of 52,000 lbs. or more and not more than 62,000 lbs. per sq. in.; an elongation of not less than 25 per cent in 8 in., with a reduction of cross-sectional area of not less than 50 per cent. at fracture, which will be silky in character. All rivets will be of soft open-hearth steel, having a tensile strength of not less that 50,000 lbs. nor more than 58,000 lbs. per sq. in.; an elongation of not less than 28 per cent in 8 in., with reduction of cross-sectional area at the fracture of not less than 50 per cent.

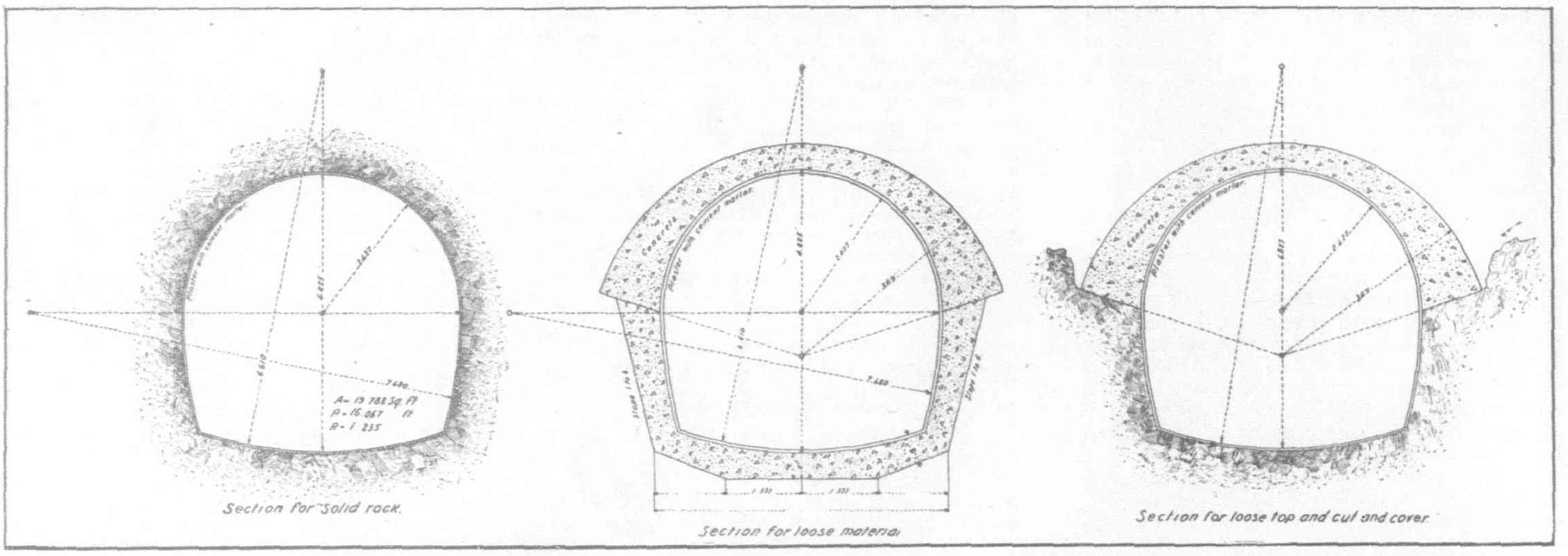
DESCRIPTION OF PIPE.—The length of the pipe is approximately 10.6 miles and its diameter 42 in. on inside of smaller courses. The total weight, exclusive of rivets and coating, is estimated at 5,300,000 lbs. The pipe will be cylindrical, and will be composed of alternate large and small courses, the smaller one fitting at each end into the larger. Each course will be made from one plate and the pipe will be made up in lengths of 4 courses, but the number of courses may be increased to 6 if deemed advisable by the engineer. All plates will be 60 in. or more in width. Longitudinal seams will be double riveted and circular seams single riveted excepting at curves, where circular seams will be double riveted at the beveled joints when ordered by the engineer. At each section of longitudinal or circular seams plates will be scarfed or hammered to thin edges. The dimensions of the pipe are as follows:—

Inside diameter of small courses, 42 in.
Thickness of sheets, 0.203 in.
Diameter of rivets, 7-16 in.
Diameter of rivet holes, 8-16 in.
Length of seam rivets, 1 3-16 in.
Length of lap rivets, 1 5-16 in.
Distance from center of nearest rivets to edge of plate on all seams, 0.75 in.
Distance between rows of rivets on double-riveted seams, 0.875 in.
Approximate average pitch in double-riveted straight seams, 1.75 in.
Approximate average pitch in single-riveted round seams, 1.40 in.

COATING.—After the pipe has been made up in courses and tested it shall be thoroughly dried and cleaned and will then be subjected to a bath prepared and applied in the following manner. At least two iron tanks of suitable size placed over brick furnaces shall be filled nearly full with blocks of pure-grade refined asphaltum, which shall be melted and fluxed with a sufficient quantity of coal tar or natural liquid asphalt equal to that known as "Maltha," L-grade asphalt, to give the proper consistency to the mixture when at the temperature required. The mixture shall then be heated while being frequently stirred until the entire charge becomes a fluid. The temper of the mixture shall then be tested by immersing in the boiling fluid a piece of three-eighths-inch plate not less than 6 inches square, which must be allowed to remain therein at least ten minutes. It will then be removed and immediately cooled in ice-cold water. If the coating should then crack or fly off upon striking the plate with a hammer, it will determine that the coating is too brittle. If the coating does not fly off under the hammer test, but softens at a temperature of 100° F., it will determine that the coating is too soft, and either more asphaltum or more flux must be added until such temper of the mixture is secured as will withstand the hammer test and also remain sufficiently hard and firm at a temperature of 100° F. The pipe shall then be completely submerged in a tank in which the mixture is heated to a temperature of from 350° to 400° F. and left therein at least twenty minutes, or long enough for the iron to attain the temperature of the mixture. It shall then be withdrawn, the coating allowed to stiffen for about fifteen minutes and then immersed a short time in the second tank to thicken the coat. The temperature of the mixture in the second tank shall be from 225° to 250° F. Suitable appliances shall be furnished by the contractor at his own expense to lower, raise, and revolve pipes in the bath. The thickness of the coating shall be such as the engineer may deem necessary to effectually protect the metal. The materials for the mixture, appliances and methods of boiling, melting, or applying and testing the coating shall be subject to the approval of the engineer in all cases. Fresh materials shall be added to the bath from time to time in the right proportions to keep the mixture of the proper consistency, and the tank must be occasionally emptied of its contents and refilled with fresh material when ordered by the engineer. In case that, from any cause, the coating on any length is found to be defective, it must be renewed, and, should the defect be from brittleness, scaling, or improper composition or application of the coating, it must be scraped off entirely outside and inside and another coating applied.

Bidders are requested to make a supplementary proposal for coating the pipe by what is known as the Sabin process, manufactured and controlled by Messrs. Edward Smith & Co., 45 Broadway, New York City. If the contractor shall present satisfactory proof of the efficiency of some other coating, the engineer may approve of the same in writing, and it may then be substituted.

SPECIALS.—The plans show the alignment of the pipe lines, and profiles show the elevations of the pipes at various points. Pipe will be made of such dimensions as to fit the lines thus shown. To attain this end a sufficient number of courses will be cut and punched on the bevel to make the required curves at angle points in the plan or profile without giving

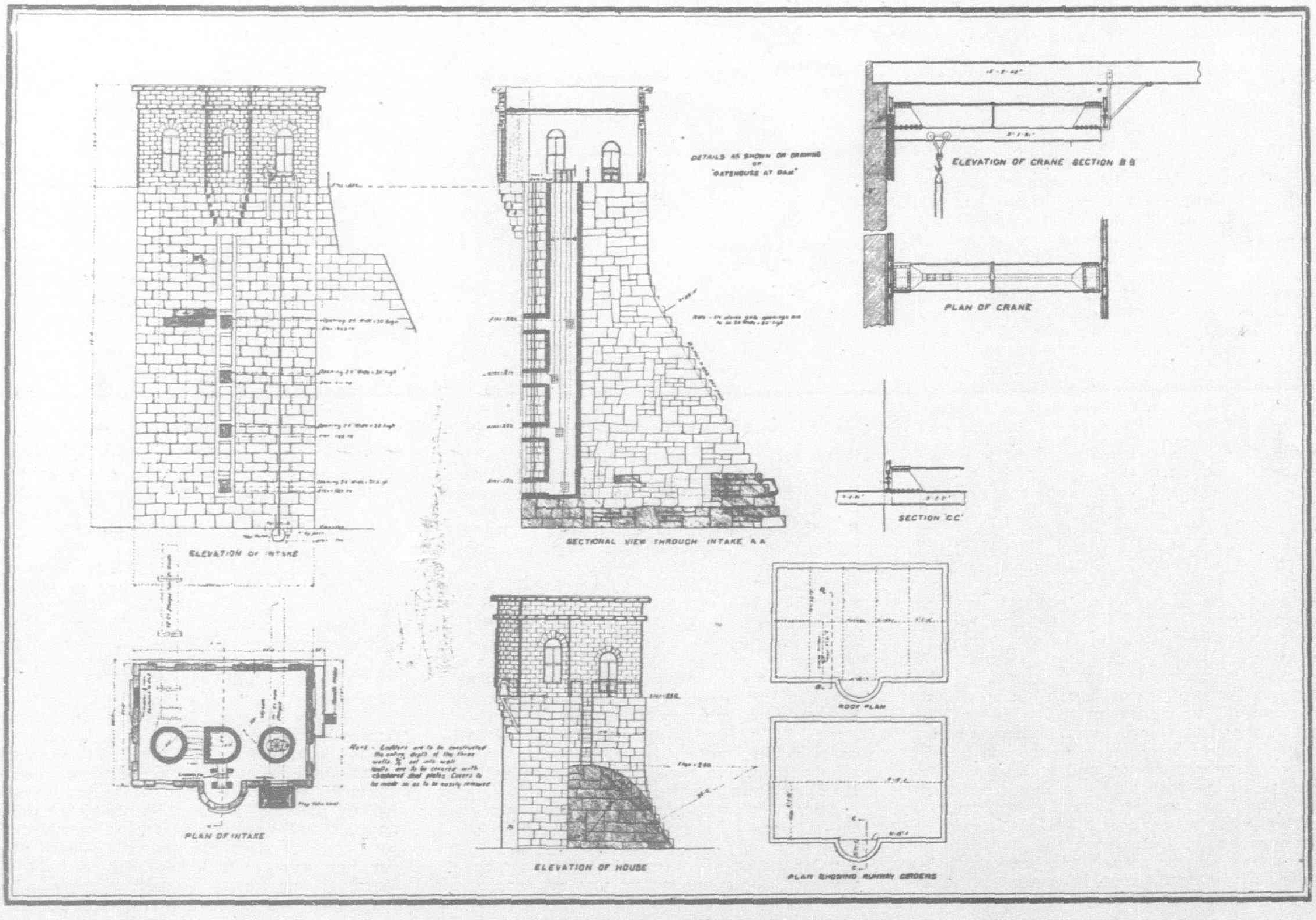

A = 19.788 Sq. ft.
P = 16.067 ft.
R = 1.235
Section for solid rock.
Section for loose material
Section for loose top and cut and cover
concrete
plaster with cement mortar

GRAVITY WATER SUPPLY.—SECTION OF THE VIADUCT.

unfair holes for the rivets and without forcing at the field joints. Bends will be braced on the outside with masonry or concrete wherever the engineer so orders. Manholes, air valves and blow-offs will be connected with the pipes by means of steel rings 3 in. wide and ¼ in. thick placed on the inside of the larger courses and riveted to the steel of the pipes and flanges of the fittings by means of hot rivets of suitable dimensions.

LAYING PIPES.—On soft or yielding ground leaded sleeve joints will be used for connecting the extremities of two lengths of pipe. Connection will be made at the junction of two large courses by means of an inside sleeve riveted on the outside of one course and projecting into the inside of the other, and an outside sleeve over the joint of wrought iron, leaving an annular space to be filled and calked with lead. At each syphon chamber the end of the steel pipe line will be connected to the chamber by being inserted into the bell of a casting set into the wall of the chamber and making a leaded joint. The end of the pipe which is to fill the bell of the casting will be reenforced with a ring of steel plate. These reenforced rings will be thoroughly calked at both ends. The whole space between the pipe and the bell of the casting will be filled nearly to its full depth with lead which lead will be very thoroughly calked.

Pipe will be laid in sections of convenient length and each section of pipe, when it shall have been riveted, calked, and cleaned, will be tested to a hydraulic pressure of 75 lbs. per sq. in., at least. The line will be provided with manholes, blow-off connections, and connections for air valves. Manholes will have openings approximately 14 x 16 in. For the blow-offs suitable curved pipes having flanges to which valves can be bolted will be riveted to the pipes. All manhole frames and covers, blow-offs and air-valve connections, and other castings to be riveted to the pipes will be of cast steel. Each blow-off will be furnished with a sufficient length of 6 in. steel waste pipe, No. 14 Birmingham wire gauge, to conduct the waste water to a suitable ravine or water course. Each blow-off, manhole, and air value will also be provided with a concrete or brick well, laid in cement and covered with a cast-iron manhole cover and the City of Manila will furnish the air valves and fittings, and valves, frames and covers for valve chambers, and additional special castings required for the blow-offs. Concrete foundations of approved dimensions wille placed bunder blow-off castings.


ELEVATION OF INTAKE
DETAILS AS SHOWN ON DRAWING OF "GATEHOUSE AT DAM"
SECTIONAL VIEW THROUGH INTAKE A A
ELEVATION OF CRANE SECTION B B
PLAN OF CRANE
SECTION CC
PLAN OF INTAKE
ELEVATION OF HOUSE
ROOF PLAN
PLAN SHOWING RUNWAY GIRDERS

GRAVITY WATER SUPPLY.—GATECHAMBER AT DAM.

MARIQUINA RIVER CROSSING.—The pipe line will be carried under the bed of the Mariquina River near the town of San Mateo by means of a cast-iron pipe, 36 in. in diameter, of the following weights and dimensions:—

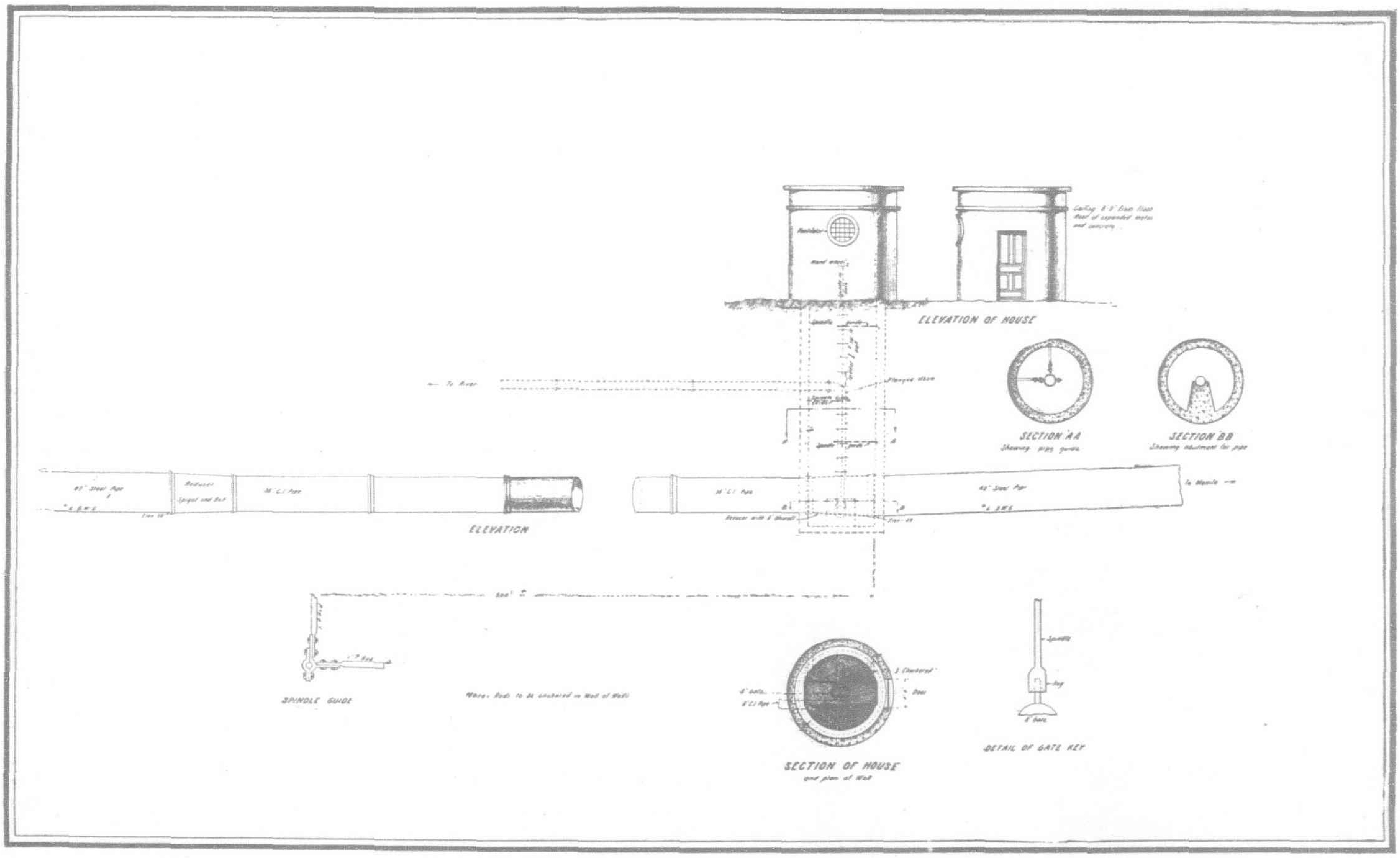
Internal diameter, 36 in.
Thickness of barrel, 1⅛ in.
Thickness of lead joints, 7-16 in. to ½ in.
Depth of hub, 4½ in.
Approximate weight of pipe 12 ft. in length 5,328 lbs.

The river during the dry season dwindles to small proportions, and it is the intention that this pipe shall be laid during the time of extreme low water. The length of this cast-iron pipe will be approximately 450 ft. between the locations of the gatehouses at each end. On the line of the pipe the trench will be dug, over which the water of the river will be carried by means of a flume. Pipe will be in lengths of 12 ft. from the bottom of the hub to the end of the spigot.

TUNNEL AND CONDUIT.—From the reservoir gatehouse at station No. 48 to station No. 305, excepting the short pipe siphons shown on the profile, there will be constructed an aqueduct in tunnel and open cut. Borings have been made along the line of the work and it is believed that the entire work will be in the soft rock locally known as *adobe* stone. According to the firmness of the material, the tunnel will be classed as unlined, partly lined, and full lined. In unlined sections *adobe* rock is expected to be of sufficient strength without reenforcement. Partly lined sections will be used when any portion of the adjoining rock is loose or unfirm. Full-lined sections will be used whenever in the judgment of the engineer the walls or arch will not stand unsupported. The contractor will trim the tunnel to the sizes shown on the plans, and on unlined sections or portions of sections he will score the bottoms, sides, and arch to a depth of ¼ of an in., with diagonal lines crossing in both directions, spaced 2½ in. between centers, to receive the plaster coat. Various sections of the aqueduct in open trench and embankment are shown in the plans. The sections to be built may vary somewhat, however, from those illustrated. Embankments and terminal chambers are also provided for. All iron and other metal required in the permanent work will be furnished by the City of Manila.

RESERVOIR AND GATEHOUSE.—The site of this work is about 1 mile easterly from the present Deposito and 1½ miles outside the limits of the City of Manila, and the same distance from water transportation at San Juan River. The work to be done consists in excavating earth and rock necessary for the construction of the reservoir and its appurtenances in conformity with the plans and specifications, and

(*Continued on page 95.*)



GRAVITY WATER SUPPLY.—MARIQUINA RIVER CROSSING.

HONGKONG AND SHANGHAI BANKING CORPORATION.

The ordinary half yearly meeting of the shareholders of the Hongkong and Shanghai Banking Corporation was held on the third Saturday of August at the city hall, Hongkong. Mr. H. A. W. Slade presided, and there were also present Messrs. A. Haupt, deputy chairman; C. W. Dickson, E. Goetz, G. H. Medhurst, A. J. Raymond, F. Salinger, H. Schubart, E. Shellim, N. A. Siebs, R. Shewan, court of directors; J. R. M. Smith, chief manager; C. W. May, chief accountant; Gershom Stewart, H. M. H. Nemazee, J. C. Peter, A. V. Apcar, N. J. Stabb, O. von der Heyde, R. R. Hynd, C. J. Gonsalves, J. A. Chinoy, H. N. Mody, E. Georg, G. M. Bain, D. D. Gazdar, J. Orange, J. A. Jupp, W. H. Potts, W. H. Gaskell, A. G. Wood, W. A. C. Cruickshank, F. D. Goddard, W. H. Purcell, W. H. Wickham, Dr. Noble, W. J. Saunders, P. C. Potts, J. Barton, J. R. Michael, S. J. Michael, G. L. Tomlin, E. S. Kadoorie, Wong Leung Him, Ho Fook, Lo Cheung Shui and Ho Kom Tong.

After the reading of the notice convening the meeting by the chief manager, the chairman said:

"Gentlemen.—It gives your directors great pleasure to come before you with another good result of six months' working of the bank. I feel sure that the report which I have just read will be considered satisfactory and I trust the distribution of profits which we recommend will also receive your approval. From the statement of accounts which has been in your hands for some time, you will have seen that, in addition to placing $5 lacs to the silver reserve, raising that fund to $8,500,000 and carrying forward some $2 lacs in excess of last half year, we propose, on this occasion, to pay a dividend of £1. 15/- per share, being an increase of 5/- on the dividend which you have regularly received for the past six and a half years. At first sight 5/- per share does not seem a large increase, but it amounts to £40,000 a year, and in percentage you will find that at present exchange it represents fully 4 per cent per annum on the capital, which I think you will admit is a very substantial addition to our dividend. Your directors fully recognize, as I am sure you must all do, the inadvisability of raising the dividend unless there are reasonable grounds for feeling confident of being able to maintain it. The proposal has therefore not been made without due consideration and only after careful observation of the steadily increasing earning power exhibited by the various branches of the bank not only in the Far East, but also in other parts of the world where we are established. But though we feel justified in thinking that the time has come for shareholders to receive a higher dividend, we are also alive to the necessity of ensuring that the bank shall be prepared to take advantage of the increased opportunities certain to accompany the great impetus to enterprise in China which is expected to follow the close of the war, and we therefore fully realize the prudence of continuing to add to our reserves. This is the surest way of maintaining the strong position in which the bank at present stands, and your directors have no intention of departing from the general line of policy in that respect which has been pursued with so much success in the past and of which we are to-day reaping the benefit. Turning now to the balance sheet and comparing it with that of 31st December last, you will notice that the total figures are considerably higher. This is to a large extent accounted for by the increase of some £2,500,000 in the gold current accounts, due chiefly to the temporary deposit of proceeds of loans recently floated. There is no appreciable change in gold fixed deposits. Silver current accounts show an increase of $5,300,000 and silver deposits are also a little higher. Bills payable have increased by $5,000,000. There is only a slight difference in our note circulation, but compared with a year ago it has gone up about $11 lacs. On the other side of the account coin lodged with the government against the excess note issue remains unchanged at $8,500,000, but cash, and bullion in hand and in transit, amount to $49,336,683.16 against $43,204,418 57. Our holdings of Indian Government rupee paper and consols, colonial and other securities, have both been slightly increased; bills discounted, loans and credits stand at $104 214,416.69 against $85,601,394 98 in December and bills receivable are nearly $12,000,000 more than last half year. Far Eastern commerce has pursued a comparatively even course throughout the past half year considering the importance of the political events which have marked the period. The effect of the war upon trade has not changed in any striking manner since we last met. Things seem to have adjusted themselves fairly comfortably to the temporary conditions. We have certainly witnessed a marked depression of trade and contraction of native credit in the South of China. This however has been mainly due to local causes, which we may hope before long to see disappear; but, viewed as a whole, the foreign trade of China continues to expand while that of Japan has shown remarkable progress, notwithstanding the continuance of hostilities. In the happy event of peace resulting from the conference now being held in America, there is good reason for anticipating a general revival of trade throughout the Far East and we may look forward with confidence to the future."

There were no questions and the chairman proposed the adoption of the report and accounts.

Mr. Orange: "Gentlemen—I feel sure the report and accounts placed before us can not fail to be satisfactory to the shareholders. The increase in dividend will be welcome, especially in view of the remarks of the chairman that this would not have been done without the prospect of being continued. We all trust that the close of the long war is near, bringing about a more secure feeling in trade and business generally. I have much pleasure in seconding the adoption of the report and accounts." (Carried.)

Mr. Saunders proposed and Mr. Barton seconded the confirmation of the appointment of Messrs. C. W. Dickson, G. H. Medhurst, and F. Salinger to the court of directors. (Carried.)

Mr. G. Murray Bain proposed, and Mr. J. A. Jupp seconded, the reelection of Mr. W. Hutton Potts and Mr. A. G. Wood as auditors. (Carried.)

Mr. Cruickshank: I propose a very hearty vote of thanks to the court of directors, the chief manager, under-managers and staff, and congratulate them on the satisfactory working of the past six months (applause.) Gratifying as the results are, we must not overlook the fact that the very substantial rise in the value of the shares is due to the able management and care of our interests on the part of those who have borne the heat and brunt of the day during the past six months (applause).

The chairman having acknowledged, the meeting terminated.

EIGHTIETH REPORT

The eightieth report of the court of directors to the shareholders in connection with the above meeting, is as follows:—

To the Proprietors of the Hongkong and Shanghai Banking Corporation. Gentlemen.—The directors have now to submit to you a general statement of the affairs of the bank, and balance sheet for the half-year ending 30th June, 1905

The net profits for the period, including $1,493,468 75, balance brought forward from last account, after paying all charges, deducting interest paid and due, and making provision for bad and doubtful accounts, amount to $3,711,062.18

The directors recommend the transfer of $500,000 from the profit and loss account to credit of the silver reserve fund, which fund will then stand at $8,500,000.

After making this transfer and deducting remuneration to directors there remains for appropriation $3,196,062.18, out of which the directors recommend the payment of a dividend of one pound and fifteen shillings sterling per share, which at 4|6 will absorb $6'2,222.22.

The difference in exchange between 4|6, the rate at which the dividend is declared, and 1|10½, the rate of the day, amounts to $871,111 11.

The balance $1,702,728 85 to be carried to new profit and loss account.

DIRECTORS—Mr H. E. Tomkins, the Honorable Mr. W. J. Gresson, and Mr E. S. Whealler having resigned their seats on leaving the colony, the Honorable Mr. C. W. Dickson, Mr, G. H. Medhurst, and Mr. F. Salinger have been invited to fill the vacancies; these appointments require confirmation at this meeting.

Mr. H. A. W Slade has been elected chairman for the remainder of the year in place of Mr. Tomkins, and Mr. A. Haupt succeeded Mr. Slade as deputy chairman.

AUDITORS—The accounts have been audited by Mr W. *Hutton Potts and* Mr. A. G. *Wood, who* offer themselves for re-election.—H. A. W. SLADE, Chairman.

ABSTRACT OF ASSETS AND LIABILITIES, HONGKONG AND SHANGHAI BANKING CORPORATION.

30th June, 1905.

Liabilities.

Paid-up capital, ...		$10,000,000.00
Sterling reserve fund, ...		10,000,000.00
Silver reserve fund, ...		8,000,000.00
Marine insurance account		250,000.00
Notes in circulation:—		
Authorized issue against securities deposited with the crown agents for the colonies, ...	$10,000,000.00	
Additional issue authorized by Hongkong Ordinance No. 19 of 1900, against coins lodged with the Hongkong Govt., ...	5,993,312.00	
		15,993,312.00
Current accounts,—		
Silver, ...	$76,300,659.70	
Gold, £5,046,747 6s. 11*d*...=	64,849,013.58	
		141,149,673 28
Fixed deposits,—		
Silver, ...	$50,985,56[illegible].11	
Gold, £5,267,426 8s. 11*d*...=	56,502,384.54	
		107,487,953.65
Bills payable (including drafts on London bankers, call loans and short sight drawings on London office against bills receivable and bullion shipments), ..		17,358,365 69
Profit and loss account, ...		3,711,062.18
Liability on bills of exchange rediscounted £4,579,869 2*s*. 9*d* of which £3,068,082 16s. 8*d*. have since *run off*.		
		$313,950,366.80

Assets.

Cash, ...		$44,223,818.50
Coin lodged with the Hongkong Government against note circulation in excess of $10,000,000		8,500,000.00
Bullion in hand and in transit, ...		5,112,864 66
Indian government rupee paper, ...		2,378,061.98
Consols, colonial and other securities,..		11,576,537.66
Sterling reserve fund investments, viz.:—		
£570,000 2½ % consols at 85 ..... (of which £250,000 lodged with the Bank of England as a special London reserve.)	£484,500	
£255,000 2 3/4 % national war loan, at 90	229,500	
£325,000 other sterling securities, written down to	286,000	
	£1,000,000	10,000,000.00
Bills discounted, loans and credits,.....		104,214,416 69
Bills receivable, ...		126,906,177 69
Bank premises,....		1,038,489.62
		$313,950,366 80

GENERAL PROFIT AND LOSS ACCOUNT, HONGKONG AND SHANGHAI BANKING CORPORATION.

30th June, 1905.

Dr.

To amounts written off:—		
Remuneration to directors, ...$		15,000.00
To dividend account:—		
£1.15/ per share on 80,000 shares=£140,000 @ 4/6	$622,222.22	
" Dividend adjustment a/c:—		
Difference in exchange between 4/6, the rate at which the dividend is declared, and 1/10½, the rate of the day, ...		871,111 11
" Transfer to silver reserve fund, ...		500,000 00
" Balance forward to next half-year,....		1,702,728 85
		$3,711,062.18

Cr

By balance of undivided profits, 31st Dec. 1904, ...	$1,493,468 75	
" amount of net profits for the six months ending 30th June, 1905, after making provisions for bad and doubtful debts, deducting all expenses and interest paid and due, ...	2,217,653 43	
		$3.711 062 18
		$3,711,062.18

STERLING RESERVE FUND.

To balance,.......................	$10,000,000 00
By balance 31st Dec , 1904, (invested in sterling securities), ...	$10,000,000 00

SILVER RESERVE FUND

To balance,................................	$ 8,500,000 00
By balance 31st Dec., 5904, ...	$ 8,000 000 00
" transfer from profit and loss account,	500,000.00

J. R. M. SMITH, Chief Manager.
C. W. MAY, Chief Accountant

H. A. W. SLADE, }
A. HAUPT, } Directors.
E. SHELLIM, }

We have compared the above statement with the books, vouchers and securities at the head office, and with the returns from the various branches and agencies, and have found the same to be correct.

W. HUTTON POTTS, }
A. G. WOOD, } Auditors.

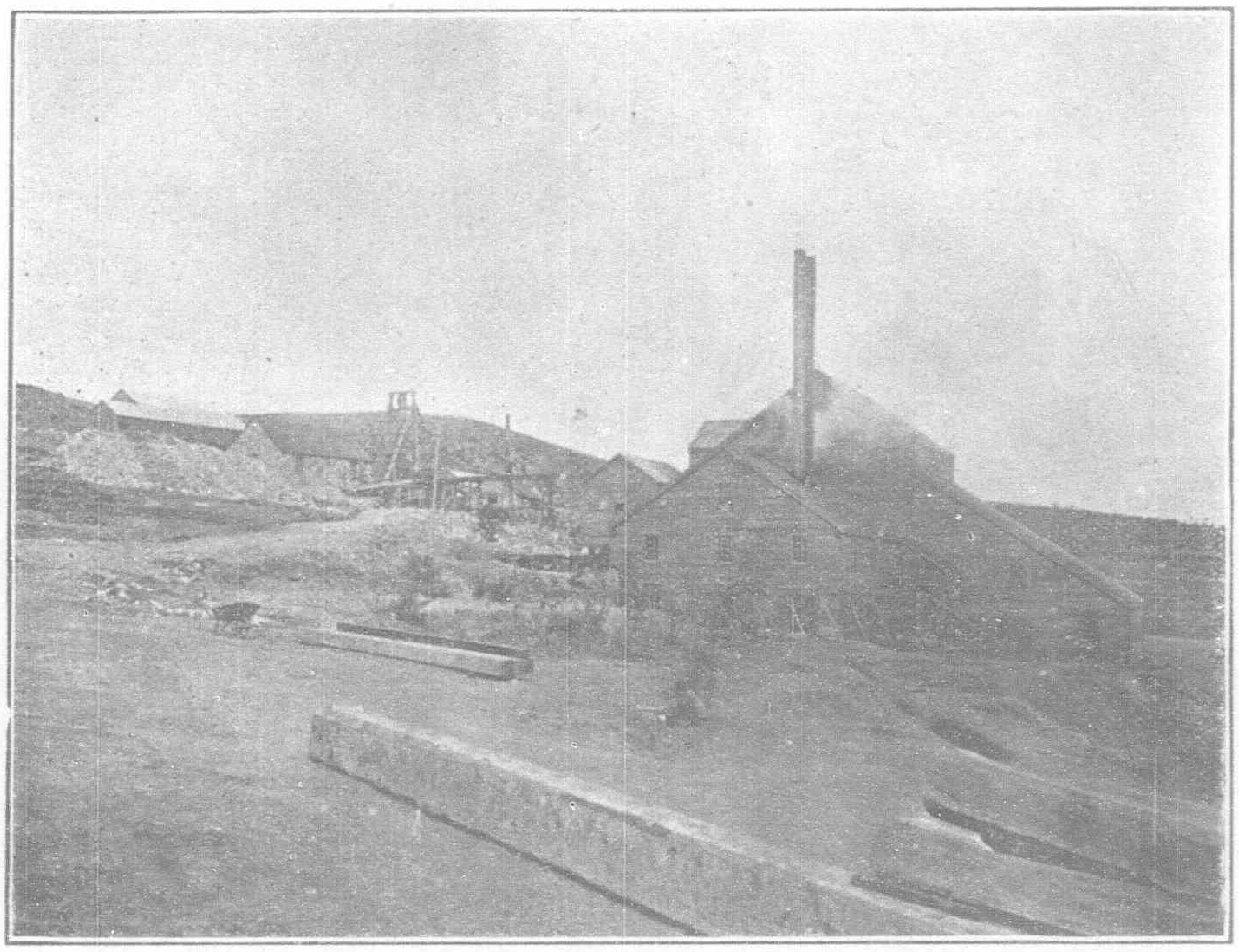
SIR THOMAS JACKSON, BART.

The splendid showing made by the court of directors of the Hongkong and Shanghai Banking Corporation, in its eightieth report to the shareholders, in which conservative and progressive financeering is the salient feature, should revive in the minds of all those interested in this great corporation the brilliant career of Sir Thomas Jackson, Bart., as chief manager of the bank in the days of its infancy. Sir Thomas is now residing in London, where he holds a high place in the councils of that office of the corporation, besides other important positions in the financial world. For more than twenty-six years prior to 1902, when he returned to England, Sir Thomas guided the destinies of the bank as its chief manager in Hongkong. During this period he was the foremost financier of the Far East, and in addition he exhibited great public spirit in connection with the upbuilding of Hongkong Colony, the influence of which was felt everywhere along the China Coast. As chief manager of probably the strongest bank in the British Empire, with the single exception of the Bank of England, Sir Thomas was looked upon out in the Orient as the strongest man of his day. Besides his duties with the corporation he devoted much time and attention to the finances of the Chinese Empire, to whom the Peking officials turned when they found it necessary to negotiate loans for the public good. By his broad-minded policy Sir Thomas endeared himself to everybody with the result that today he commands the respect and highest esteem of all persons in the Orient. He is one of the very few great men who have been honored with a statue while still living, and the reproduction on the title page of this issue of THE FAR EASTERN REVIEW will give readers a good idea of the fine erect statue by Raggi (1904), which occupies a prominent site in Hongkong.

Sir Thomas was born in Ireland, June 4th, 1841, his father being David Jackson of Urker, Croosmaglen. He was educated at Morgan's School, Castle Knock, Ireland, and by private tutors, and in 1871 married Amelia Lydia Dare. He commenced banking in the Bank of Ireland, Belfast, in 1860, and came to the Agra Bank in the East in 1864. He joined the Hongkong and Shanghai Banking Corporation in 1866, and became its chief manager in 1876. He was knighted by Queen Victoria in 1899 for distinguished services to her government and was created a baronet (the first of his line), in 1902. His heir is Captain Dare Thomas Jackson, and his present residence is at Stansted House, Stansted, Essex. He is a prominent club man in London, holding membership in the City, Carleton, Thatched House and City of London clubs. Sir Thomas is also an enthusiastic golfer, in which recreation he takes great delight in spite of his advanced age and busy life.

DEVELOPMENT OF THE WEIHAIWEI (NORTH CHINA) GOLD MINES

Mining in China is yet in its infancy, and while there remains little doubt as to the extreme richness of the mineral resources of the empire, few mines have been developed by modern machinery, and results are still problematical. The development of the industry has been greatly retarded and impeded by the obstinacy of the Chinese officials, and their inborn tendency to "graft" or mulct anyone embarking in such an enterprise. The lease of Weihaiwei to Great Britain in 1898 opened up to the investor the prospect of developing the mineral resources of that district, free from the exactions of the native "squeezers," and it was not long before a company was formed in Shanghai for this purpose. The unavoidable trials and delays which overtake all new enterprises, were shared in this instance, also, and, coupled with conflicting reports and vague rumors of the soundness of the undertaking, caused a certain amount of disappointment amongst the stockholders. The company has, however, made considerable progress. It has its mill and machinery in place, and working, and, according to expert advice, profitable results will follow as the shaft is deepened. Four prospects were opened up and considerable work lost before they were abandoned as unprofitable, and new work commenced on parallel veins at Gin Tzu Ling, which have since been followed up. There are several old Chinese workings at Gin Tzu Ling mine, some of which are quite extensive, but the new company is the first to sink shafts. The English company has staked out roughly about three miles on the line of the Gin Tzu Ling reefs, and has purchased the surface workings of the natives at reasonable figures.



WEIHAIWEI MINES.—GENERAL VIEW OF THE MILL.
Whim House. Carpenters' Whim Shop. Whim to Mill.
Ore Dump. Ore Trestle.

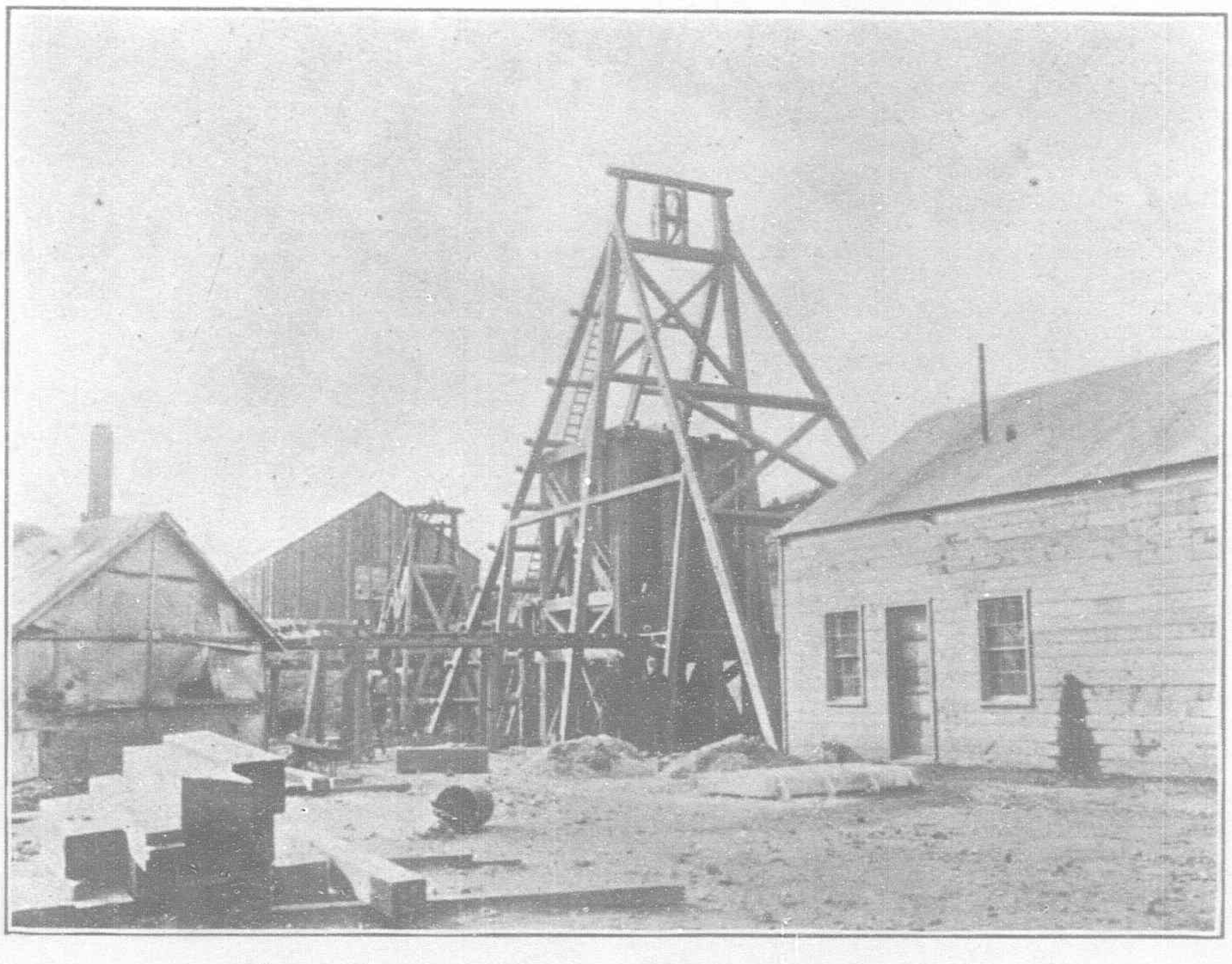
Owing to insufficient capital to carry on the work until good pay ore was reached, it looked for a time that the mines would have to shut down, but this difficulty was bridged over and work resumed, largely due to the confidence reposed in the report of the veteran engineer, Mr. R. J. Duff, the technical adviser of the company. Mr. Duff's reports on the American mines in Korea, at a time when the work was about to be abandoned as unprofitable, were of such a character as to induce the capitalists to hold on and supply more funds, with the result that today the mines have amply repaid the investors in handsome dividends.

This development of the Weihaiwei mines at the lower levels, was retarded by delays in erecting the steam-hoisting plant, and the first crushings did not pan out to the satisfaction of the shareholders, who were looking for a bonanza. Mr. Duff's first report stated that all the drifts at 40 and 100-ft. levels looked most encouraging, but as no man could look into the earth, he had been guided by appearances. He pointed to the fact that the strong outcroppings for a distance of three miles to the North and South of the workings, the character of the ore containing copper and galena sulphurites, the surest indication of a true fissure vein, and the improvement of the assays at the lower levels, all pointed to a valuable property.

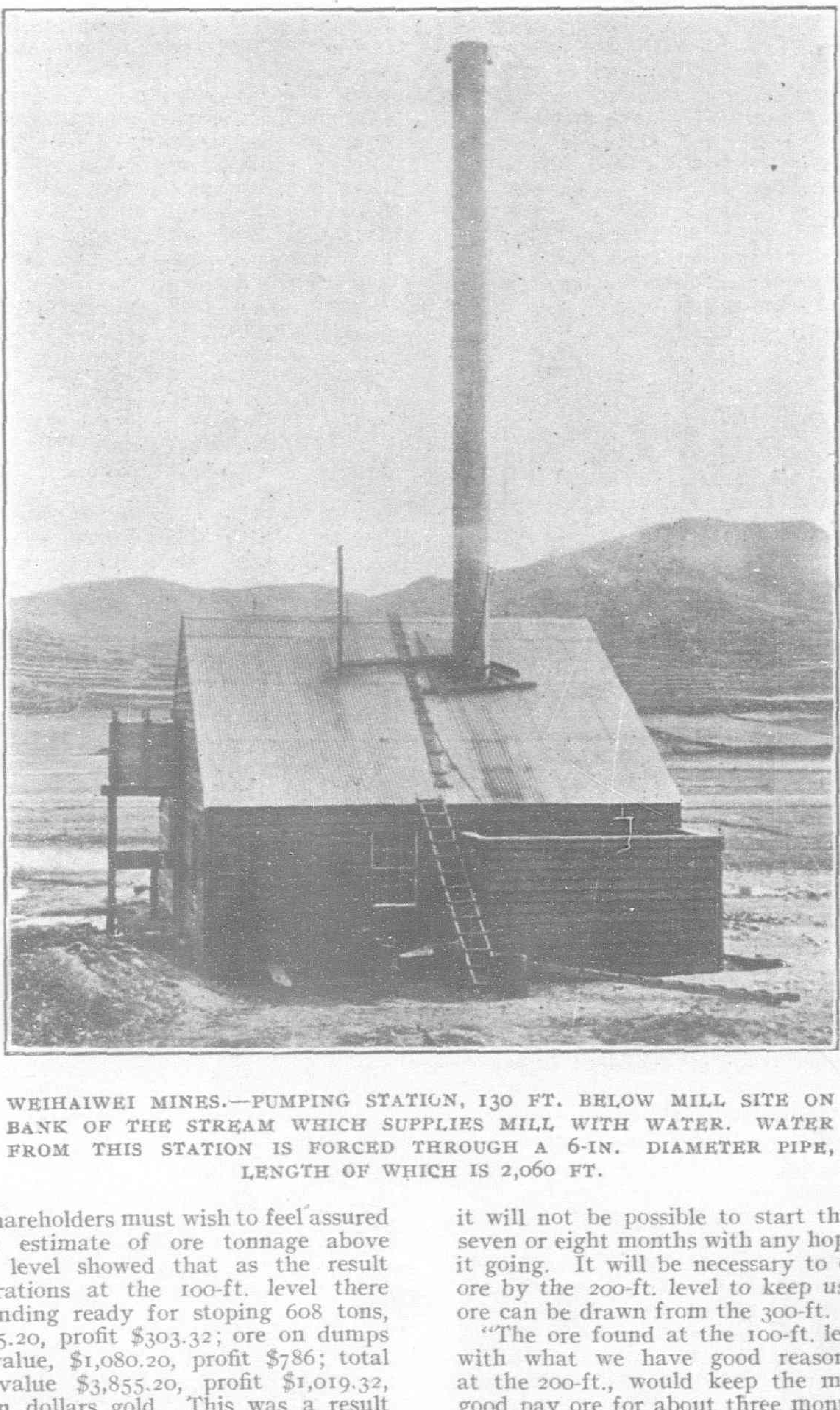
The first ordinary general meeting of the shareholders of the company was held in Shanghai recently, and the report of the engineer, Mr. Verschoyle, shows how the work has progressed up to the end of May. Following are extracts from the report:

"At the 100-ft. level there were two distinct shoots of ore, but they had now blocked out the ore down to the 100-ft. level. The prospects between the 100 and 200-ft. levels were distinctly good. Mr. Verschoyle dealt in his report first with the geological formation existing in and around the mine, and then proceeded to say that at the 100-ft. level two distinct shoots of ore had been cut through. These were both cut on the surface and were evidently both going down below the 100-ft. level, as was evidenced by the developments in No. 2 shaft and No. 2 winze. In both cases also it was plain that in both size and value the shoots were increasing. It was unusual to see two so close together and having no connection with one another. From the fact that both the No. 3 shaft and No. 2 winze, which were cutting diagonally across the shoots, continued in a good width of ore at a point where it might reasonably be expected they would be thinning out, it might be concluded that both shoots were lengthening. They, therefore, were led to the conclusion that whether above or below the 100-ft. level, they would eventually have one body of ore.

"Mr. Verschoyle emphasized the fact that this and subsequent deductions were based on a somewhat meagre supply of facts; they might prove entirely erroneous; they were only introduced because he wished to show that the expenditure necessary to exploit the 200-ft. level was justifiable, a point which



WEIHAIWEI MINES.—MAIN HOISTING PLANT AND WHIM.
Blacksmith Shop. End of Whim House. Hoist Engine and Boiler House.
Hoist Trestle to Mill. Mr. Duff and Mine Foreman.



WEIHAIWEI MINES.—PUMPING STATION, 130 FT. BELOW MILL SITE ON BANK OF THE STREAM WHICH SUPPLIES MILL WITH WATER. WATER FROM THIS STATION IS FORCED THROUGH A 6-IN. DIAMETER PIPE, LENGTH OF WHICH IS 2,060 FT.

he felt the shareholders must wish to feel assured upon. The estimate of ore tonnage above the 100-ft. level showed that as the result of the operations at the 100-ft. level there was outstanding ready for stoping 608 tons, value $2,775.20, profit $303.32; ore on dumps 300 tons, value, $1,080.20, profit $786; total 908 tons, value $3,855.20, profit $1,019.32, all values in dollars gold. This was a result that left much to be desired. The cost of milling 1,691 tons in December was $1.26. With certain alterations this might be reduced to $0.88, and later perhaps lower.

"The cyaniding costs contemplate treatment of concentrates only, or about 6 per cent of the ore mined. The item 'Mining' includes the cost of development, that is to say, cost of main shaft, levels, winzes, etc. It is obvious that the tonnage and value of ore opened up on, say the 200-ft. level, must be considerably greater than that over the 100-ft. to make it a payable transaction. Altogether it will take about 760 ft., some of which is already completed, to open up the 200-ft. level. Taking the May per foot cost at $11.80 the total cost of this work will be $8,968 (Mex.), exclusive of European salaries and Shanghai office expenses. Taking the cost of development at 25 per cent of the total cost of winning and treating the ore (a figure which it should not exceed) the total tonnage developed should have a value not less than $35,872 (Mex.).

"As to treatment of the ore, this is a subject with which it is at present impossible to deal. I think that we will be able to concentrate and cyanide, but in some of the best of the ore now coming to hand there is so much copper that cyaniding would be difficult and besides will not save the copper, which is likely to be of some importance, if the same class of ore continues.

"Unless exceptionally good developments occur in ore shoots No. 1 at the 200-ft. level, it will not be possible to start the mill under seven or eight months with any hope of keeping it going. It will be necessary to open enough ore by the 200-ft. level to keep us going until ore can be drawn from the 300-ft.

"The ore found at the 100-ft. level, together with what we have good reason to expect at the 200-ft., would keep the mill going on good pay ore for about three months, allowing a duty of three tons per stamp per day. By keeping the main shaft going down and starting winzes from the 200-ft. level as soon as possible, it will be just about possible to start the mill as soon as the 200-ft. level is run out to the end of No. 2 shoot."

Mr. Duff, asked for his opinion, said he thought the development of the mine most encouraging; everything looked better the farther they went. The ore should be sorted before it went to the mill so as not to mill ore that would not pay for it, and only that that would pay. Present developments were most encouraging. There was no better ore ever came out of a mine than that on the table, and if they had only 5 or 6 ft. of it the company would soon be paying dividends.

RAILWAYS OF JAPAN

The fifth *Financial and Economical Annual of Japan*, recently issued by the Imperial Department of Finance, at Tokyo, gives some very valuable data on the various enterprises of the country, as also a series of tabulated statistics on the railways of the empire, from which the following information is extracted which at the present time should be of more than ordinary interest and value to the Philippines, as it gives an estimate of the cost of such work in the East. The Japanese railways are all narrow gauge while the new lines proposed for the Philippines are of standard gauge, to be equipped with the most modern and approved appliances such as are in use in the United States.

The first government railway built in Japan was that between Tokyo and Yokohama, 18 m. long, which was opened in 1872. From that time the government made every effort to construct more lines, until by the fiscal year 1882-3 150 m. had been completed. The railway was at the time generally looked upon as a government undertaking, and no attempt was made among the people to engage in railway enterprise. In 1883, however, a private company was for the first time formed for the construction of railways; and thereafter railway enterprise made gradual progress among the people. In 1887 the Private Railway Regulations were issued; and both government and private railways increased and grew annually in prosperity. Now, private lines have in mileage left the government lines far behind. In March, 1900, the Private Railways Law and the Railway Traffic Law were promulgated, thereby completing the legislation, private and public, in respect to railways. Although it has always been the policy of the government to encourage railway construction, new companies experienced no little inconvenience in obtaining the funds necessary for carrying on and extending their business because of their inability under the laws in force to mortgage their lines. To remedy this defect, the Railway Mortgage Law was promulgated in March last. Under this law a private joint-stock company may form a railway foundation with the whole or a part of its railway lines, land for railway use, buildings, instruments and appliances for railway use of attached to the railways, the rolling stock and instruments and appliances appertaining thereto, and make such foundation the object of a mortgage. The amount of obligations, moreover, that may be incurred by the company on mortgage of its railway foundation, when added to the amount of its already existing debentures, must not exceed its total paid up capital, the amount of its old debts, however, not being included therein. This law further contains detailed provisions respecting the effect of mortgage, registration of railway foundation, and compulsory administration and sale by auction. The law will, it is confidently believed, contribute materially to the activity or railway enterprise in the empire.

TOKAIDO LINE.—Lines in operation, 403.52 m.; length of track, 811.60 m.; under construction, 2.57 m. *Cost of Construction*—Lines in operation, -Y-53,702,091; lines under construction, -Y-820,170. Total, -Y-54,522,261. Average cost per m. of lines in operation (total), Y-133,041. Expenses, including rolling stock, -Y-103,489. *Itemization of Cost*—Location and survey, inspection and general expenses -Y-1,785,857; purchase of land, -Y-2,381,435; earthwork, -Y-6,271,709; bridges, -Y-12,462,574; culverts, -Y-1,464,858; draining, -Y-193,731; tunnels, -Y-3,794,120; permanent way, -Y-7,084,240; stations, -Y-2,541,796; landing places, -Y-6,655; rolling stock, -Y-11,928,719; workshops, -Y-1,152,367; various buildings, -Y-626,735; transportation, -Y-904,277; construction trains, -Y-234,767; tools and implements -Y-257,292; fences and boundary marks, -Y-63,404; telegraph and telephones, -Y-209,431; other expenses -Y-39,152. Total, -Y-53,702,091. *Revenue and Expenditure*—Receipts: Passenger, -Y-9,831,538; freight, -Y-3,936,258; other sources, -Y-291,295. The Total, -Y-14,059,091. Expenses: Maintenance, -Y-1,176,127; motive power, -Y-2,328,297; traffic, -Y-1,662,502; general, -Y-121,566. Total, -Y-5,288,492. *Net Earnings*—Total, -Y-8,770,599; rate to cost of construction (per cent), 16.3. *Earnings and Expenses per Day, per Mile.*—Average receipts per day per mile. Passenger, -Y-66.55; freight, -Y-26.64; other sources, -Y-1.97. Total, -Y-95.16. Expense: Maintenance, -Y-7.96; motive power -Y-15.76; traffic, -Y-11.25; general, -Y-0.82. Total -Y-35.79. Net earnings, -Y-59.37. Average receipts per train mile, -Y-2.33; expenses, -Y-0.88; net earnings, -Y-1.45; expenses per -Y-100 of earnings, -Y-37.62.

HOKURIKU LINE.—Lines in operation, 154.12 m.; length of track, 179.13 *Cost of Construction*

—Lines in operation, -Y-12,386,034; average cost per m. of lines in operation (total), -Y-80,351; expenses, including rolling stock, -Y-71,259. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-685,361; purchase of land, -Y-704,750; earthwork, -Y-1,683,269; bridges, -Y-1,856,013; culverts, -Y-400,235; draining, -Y-67,026; tunnels, -Y-1,943,405; permanent way, -Y-1,713,202; stations, -Y-443,183; landing places, -Y-105,673; rolling stock, -Y-1,401,458; workshops, -Y-60,904; various buildings, -Y-184,695; transportation, -Y-914,188; construction trains, -Y-73,456; tools and implements, -Y-93,901; fences and boundary marks, -Y-13,429; telegraph and telephones, -Y-41,856; other expenses, -Y-30. Total, -Y-12,386,034. *Revenue and Expenditure*—Receipts: Passenger, -Y-997,917; freight, -Y-646,724; other sources, -Y-13,359. Total, -Y-1,658,000. Expenses: Maintenance, -Y-286,544; motive power, -Y-323,744; traffic, -Y-225,834; general, -Y-19,708. Total, -Y-855,830. *Net Earnings*—Total, -Y-802,170; rate to cost of construction (per cent), 6.5. Expenses—Total, -Y-802,170. *Earnings and Expenses per day per Mile*—Average receipts per day per mile: Passenger, -Y-17.69; freight, -Y-11.46; other sources, -Y-0.24. Total, -Y-29.39. Expenses: Maintenance, -Y-5.08; motive power, -Y-5.74; traffic, -Y-4; general, -Y-0.35. Total, -Y-15.17. Net earnings, -Y-14.22. Average receipts per train mile, -Y-1.61; expenses, -Y-1.83; net earnings, -Y-0.78; expenses per -Y-100 of earnings, 51.62.

Central Line (East and West Lines).—Lines in operation, 110.81 m.; length of track 134.29 m.; under construction, 113.28 m. *Cost of Construction*—Lines in operation, -Y-19,933,140; lines under construction, -Y-4,090,181. Total, -Y-24,023,321. Average cost per mile of lines in operation (total), -Y-349,124. Expenses, including rolling stock, -Y-332,401, *Itemization of Cost*—Location and survey. inspection and general expenses, -Y-1,802,974; purchase of land, -Y-2,002,765; earthwork, -Y-3,533,451; bridges, -Y-2,034,587; culverts, -Y-507,639; draining, -P-146,676; tunnels, -Y-8,467,495; permanent way, -Y-1,961,506; stations, -Y-476,837; rolling stock, -Y-939,128; workshops, -Y-23,484; various buildings, -Y-361,694; transportation, -Y-1,299,036; construction trains, -Y-114,488; tools and implements, -Y-274,101; fences and boundary marks, -Y-17,323; telegraph and telephones, -Y-60,137. Total, -Y-24,023,321. *Revenue and Expenditure*—Receipts: Passenger, -Y-374,256; freight, -Y-212,501; other sources, -Y-6,718. Total, -Y-593,475. Expenses: Maintenance, -Y-100,964; motive power, -Y-127,394; traffic -Y-96,412; general, -Y-7,676. Total, -Y-332,446. *Net Earnings*—Total, -Y-261,029; rate to cost of construction (per cent), 3.2. *Earnings and Expenses per Day, per Mile*—Average receipts per day per m.: Passenger, -Y-19.95; freight, -Y-11.39; other sources, -Y-0.35. Total, -Y-31.69. Expenses: Maintenance, -Y-5.38; motive power, -Y-6.75; traffic, -Y-5.11; general, -Y-0.41. Total, -Y-17.65. Net earnings, -Y-14.04. Average receipts per train m., -Y-2.76; expenses, -Y-1.45; net earnings, -Y-1.31; expenses per -Y-100 of earnings, 109.51.

Shinyetsu Line.—Lines in operation, 117.66 m.; length of track, 139 m. *Cost of Construction*—Lines in operation, -Y-7,565,548; average cost per m. of lines in operation (total), -Y-64,210; expenses, including rolling stock, -Y-52,305. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-317,172; purchase of land, -Y-375,113; earthwork, -Y-1,298,220; bridges, -Y-639,879; culverts, -Y-209,563; draining, -Y-61,745; tunnels, -Y-822,558; permanent way, -Y-1,162,209; stations, -Y-422,239; landing places, -Y-133; rolling stock, -Y-1,402,661; workshops, -Y-114,419; various buildings, -Y-195,958; transportation, -Y-444,179; construction trains, -Y-30,741; tools and implements, -Y-28,843; fences and boundary marks, -Y-5,824; telegraph and telephones, -Y-34,092. Total, -Y-7,565,548. *Revenue and Expenditures*—Receipts: Passenger, -Y-863,643; freight, -Y-573,069; other sources, -Y-16,071. Total, -Y-7,565,548. Expenses: Maintenance, -Y-279,979; motive power, -Y-613,373; traffic, -Y-230,360; general, -Y-26,346. Total, -Y-1,150,058. *Net Earnings*—Total, -Y-302,725; rate to cost of construction (per cent), 4. *Earnings and Expenses per Day, per Mile*—Average receipts per day per m.: Passenger, -Y-20.03; freight, -Y-13.29; other sources, -Y-0.37. Total, -Y-33.69. Expenses: Maintenance, -Y-6.49; motive power, -Y-14.23; traffic, -Y-5.34; general, -Y-0.61. Total,-Y-26.67. Net earnings,-Y-7.02. Average receipts per train mile, -Y-1.52; expenses, -Y-1.20; net earnings, -Y-0.32; expenses per -Y-100 of earnings, 79.16.

Shinonoi Line.—Lines in operation, 42.06 m.; length of track, 50.62 m. *Cost of Construction*—Lines in operation, -Y-7,677,741; average cost per m. of lines in operation (total), -Y-182,478; expenses, including rolling stock, -Y-161,973. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-459,344; purchase of land, -Y-368,651; earthwork, -Y-1,199,655; bridges, -Y-180,975; culverts, -Y-158,263; draining, -Y-27,499; tunnels, -Y-2,951,802; permanent way, -Y-572,470; stations, -Y-174,450; rolling stock, -Y-862,725; workshops, -Y-108,732; various buildings, -Y-174,391; transportation, -Y-383,895; construction trains, -Y-53,224; tools and implements, -Y-109,410; fences and boundary marks, -Y-6,263; telegraph and telephones, -Y-12,992. Total, 7,677,471. *Revenue and Expenditure*—Receipts: Passenger, -Y-216,159; freight, -Y-177,795; other sources, -Y-2,078; Total, -Y-396,032. Expenses: Maintenance, -Y-113,962; motive power, -Y-92,563;; traffic, -Y-50,894; general, -Y-6,016. Total, -Y-263,435. *Net Earnings*—Total, -Y-132,597; rate to cost of construction (per cent), 1.7. *Earnings and Expenses per Day, per Mile*—Average receipts per day, per m.: Passenger, -Y-14.04; freight, -Y-11.55; other sources, -Y-0.13. Total, -Y-25.72. Expenses; Maintenance, -Y-7.40; motive power, -Y-6.01; traffic, -Y-3.31; general, -Y-0.39. Total, -Y-17.11. Net earnings, -Y-8.61. Average receipts per train m., -Y-1.56; expenses, -Y-1.04; net earnings, -Y-0.52; expenses per -Y-100 of earnings, 66.52.

Ohu Line (South and North Lines).—Lines in operation, 217.01 m.; length of track, 254.03 m.; under construction, 84.74 m. *Cost of Construction*—Lines in operation, -Y-18,683,494; lines under construction, -Y-4,300,679. Total, -Y-22,984,173. Average cost per m. of lines in operation (total), -Y-176,627; expenses, including rolling stock, -Y-164,011; *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-1,518,945, purchase of land, -Y-1,314,501; earthwork, -Y-4,192,915; bridges, -Y-3,096,871; culverts. -Y-844,216; draining, -Y-293,025; tunnels, -Y-3,523,179; permanent way, -Y-3,629,824; stations, -Y-706,222; rolling stock, -Y-1,362,024; workshops, -Y-25,134; various buildings, -Y-654,740; transportation, -Y-1,351,806; construction trains, -Y-216,589; tools and implements, -Y-129,173; fences and boundary marks, -Y-29,199; telegraph and telephones, -Y-85,810. Total, -Y-22,984,173. *Revenue and Expenditure*—Receipts: Passenger, -Y-578,239; freight, -Y-381,351; other sources, -Y-13,838. Total, -Y-973,428. Expenses: Maintenance, -Y-373,177; motive power, -Y-345,217; traffic, -Y-199,823; general, -Y-21,575. Total -Y-939,791 (the South Line was operated at a loss of -Y-5,847 and the North Line showed a profit of -Y-39,484). *Net Earnings*—Total, -Y-33,637; rate to cost of construction, North Line, (per cent), 4. *Earnings and Expenses per Day, per Mile*—Average receipts per day per m.: Passenger, -Y-14.96; freight, -Y-9.84; other sources, -Y-0.35. Total, -Y-25.15. Expenses: Maintenance, -Y-9.67; motive power, -Y-9.03; traffic, -Y-5.16; general -Y-0.56. Total, -Y-24.42; net earnings North Line, -Y-0.90 and loss on South Line -Y-0.17. Average receipts per train m., -Y-2.53; expenses, -Y-2.45; net earnings (North Line), -Y-0.10; loss (South Line), -Y-0.02; expenses per -Y-100 of earnings, 193.97.

Kure Line.—Lines in operation, 12.35 m.; length of track, 16.37 m. *Cost of Construction*—Lines in operation, -Y-2,152,520; average cost per m. of lines in operation (total), -Y-173,067; expenses, including rolling stock, -Y-133,113. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-147,025; purchase of land, -Y-140,237; earthwork, -Y-505,639; bridges, -Y-119,931; culverts, -Y-50,897; draining, -Y-20,867; tunnels, -Y-324,905; permanent way, -Y-181,491; stations, -Y-62,785; rolling stock, -Y-496,937; workshops, -Y-20,780; various buildings, -Y-33,827; transportation, -Y-19,713; construction trains, -Y-4,393; tools and implements, -Y-3,894; fences and boundary marks, -Y-14,601; telegraph and telephones, -Y-4,598. Total, -Y-2,152,520. *Revenue and Expenditure*—Receipts: Passenger, -Y-15,559; freight, -Y-849; other sources, -Y-82. Total, -Y-16,490. Expenses: Maintenance, -Y-2,205; motive power, -Y-5,805; traffic -Y-9,646; general, -Y-415. Total, -Y-18,071. *Net Loss*—Total, -Y-1,581; rate to cost of construction (per cent), -Y-0.1 (dec). Expenses: Total decrease, -Y-1,581. *Earnings and Expenses per Day, per Mile*—Average receipts per day, per mile: Passenger, -Y-13.03; freight, -Y-0.71; other sources, -Y-0.07. Total, -Y-13.81. Expenses: Maintenance, -Y-1.81; motive power, -Y-4.86; traffic, -Y-8.08; general, -Y-0.35. Total, -Y-15.13—loss, -Y-1.32. *Net Earnings*—Average receipts per train mile, -Y-1.02; expenses, -Y-1.11; net loss, -Y-0.09; expenses per -Y-100 of earnings, 109.59.

Kagoshima Line.—Lines in operation, 40.42 m.; length of track, 48.24 m.; under construction 53.58 m. *Cost of Construction*—Lines in operation, -Y-4,576,445; lines under construction, -Y-3,109,739. Total, -Y-7,686,184. Average cost per m. of lines in operation (total), -Y-112,929; expenses, including rolling stock, -Y-98,374. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-643,758; purchase of land, -Y-435,992; earthwork, -Y-1,625,207; bridges, -Y-695,846; culverts, -Y-247,361; draining, -Y-91,599; tunnels, -Y-1,930,283; permanent way, -Y-866,336; stations, -Y-118,399; rolling stock, -Y-589,822; workshops, -Y-18,700; various buildings, -Y-155,983; transportation, -Y-179,858; construction trains, -Y-20,926; tools and implements, -Y-25,699; fences and boundary marks, -Y-16,249; telegraph and telephones, -Y-24,166. Total,- Y-7,686,184. *Revenue and Expenditure*——Receipts: Passenger, -Y-111,123; freight -Y-29,101; other sources, -Y-888. Total, -Y-141.112, Expenses: Maintenance, -Y-48,415; motive power, -Y-34,128; traffic, -Y-27,747; general, -Y-2,489. Total, -Y-112,779. *Net Earnings*—Total, -Y-28,333; rate to cost of construction (per cent), 6. *Earnings and Expenses per Day, per Mile*—Average receipts per day per mile: Passenger, -Y-8.25; freight, -Y-2.16; other sources, -Y-0.07. Total, -Y-10.48. Expenses: Maintenance, -Y-3.60; motive power, -Y-2.53; traffic, -Y-2.06; general, -Y-0.19. Total, -Y-8.38. Net Earnings, -Y-2.10. *Net Earnings*—Average receipts per train mile, -Y-1.28; expenses, -Y-1.02; net earnings, -Y-0.26; expenses per -Y-100 of earnings, 79.92.

Hokkaido Government Railways.—Lines in operation, 198.69 m.; length of track, 221.64 m.; under construction, 364.01 m. *Cost of Construction*—Lines in operation, -Y-8,886,421; lines under construction, -Y-1,062,980 Total, -Y-9,949,401. Average cost per mile of lines in operation (total), -Y-44,686; expenses, including rolling stock, -Y-39,688. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-1,061,805; purchase of land, -Y-29,955; earthwork, -Y-2,124,924; bridges, -Y-1,107,306; culverts, -Y-95,717; draining, -Y-46,519; tunnels, -Y-649,302; permanent way, -Y-2,508,063; stations, -Y-280,053; landing places, -Y-7,781; rolling stock, -Y-993,949; workshops, -Y-325,656; various buildings, -Y-300,035; transportation, -Y-159,695; construction trains, -Y-67,046; tools and implements -Y-94,936; fences and boundary marks, -Y-15,534; telegraph and telephones, -Y-52,343; other expenses, -Y-38,377. Total, -Y-9,958,996. *Revenue and Expenditure*—Receipts: Passenger, -Y-268,172; freight, -Y-446,786; other sources, -Y-32,412. Total -Y-747,373. Expenses: Maintenance, -Y-209,051; motive power, -Y-171,934; traffic, -Y-421,600; general, -Y-58,888. Total, -Y-861,473. *Net Loss*—Total, -Y-114,100; rate to cost of construction (per cent), 1.3. (dec) *Earnings and Expenses per Day,* *per Mile*—Average receipts per day per m.: Passenger, -Y-4.12; freight, -Y-6.87; other sources, -Y-0.50. Total, -Y-11.49. Expenses: Maintenance, -Y-3.21; motive power, -Y-2.64; traffic, -Y 6.48; general, -Y-0.91. Total, -Y-13.-21. Net loss, -Y-1.75. *Net Earnings*—Average receipts per train m., -Y-1.71; expenses, -Y-1.97; net loss, -Y-0.26; expenses per -Y-100 of earnings, 115.25.

Inyo Line.—*Revenue and Expenditure*—Receipts: Passenger, -Y-55,117; freight, -Y-15,-627; other sources, -Y-587. Total, -Y-71,331. Expenses: Maintenance, -Y-26,601; motive power, -Y-22,930; traffic, -Y-23,336; general, -Y-1,659. Total, -Y-74,526. *Net Loss*—Total, -Y-3,195; rate to cost of construction (per cent), 1 (dec). *Earnings and Expenses per Day, per Mile*—Average receipts per day per mile: Passenger, -Y-4.66; freight, -Y-1.32; other sources, -Y-0.05. Total, -Y-6.03. Expenses: Maintenance, -Y-2.25; motive power, -Y-1.94; traffic, -Y-1.97; general, -Y-0.14. Total, -Y-6.30; net loss, -Y-0.27. *Net Earnings*—Average receipts per train mile, -Y-0.65; expenses, -Y-0.68; net loss, -Y-0.03; expenses per -Y-100 of earnings, 104.48.

Street Line.—Lines under construction, 2 m. *Cost of Construction*—Total, -Y-2,763,331. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-114,449; purchase of land, -Y-1,264,153; earthwork, -Y-205,877; bridges, -Y-1,032,675; culverts, -Y-15,974; draining, -Y-150; permanent way, -Y-12,524; stations, -Y-35,550; rolling stock, -Y-298; various buildings, -Y-9,461; transportation, -Y-37,204; construction trains, -Y-6,962 tools and implements, -Y-27,881; fences and boundary marks, -Y-173.

Line Connecting the San-in with the San-yo.—Lines in operation, 47 m.; length of track, 54.66 m.; under construction, 89:70 m. *Cost of Construction*—Lines in operation, -Y-3,802,896; lines under construction, -Y-1,-771,402. Total, -Y-5,574,298. Average cost per mile of lines in operation (total), -Y-80,913; expenses, rolling stock included, -Y-71,844. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-386,293; purchase of land, -Y-515,310; earthwork, -Y-881,083; bridges, -Y-873,769; culverts, -Y-216,486; draining, -Y-61,108; tunnels, -Y-619,-757; permanent way, -Y-1,069,391; stations, -Y-119,254; rolling stock -Y-426,211; workshops, -Y-20,222; various buildings, -Y-102,328; transportation, -Y-193,237; construction trains, -Y-20,629; tools and implements, -Y-18,896; fences and boundary marks, -Y-7,526; telegraph and telephones, -Y-14,798. Total, -Y-5,574,298.

Maizuru Line.—Lines under construction, 25.44 m. *Cost of Construction*—Total, -Y-1,-341,459. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-106,337; purchase of land, -Y-382,072; earthwork -Y-166,337; bridges, -Y-130,110; culverts, -Y-60,340; draining, -Y-13,393; tunnels, -Y-30,862; permanent way, -Y-258,530; stations, -Y-3,531; various buildings, -Y-33,088; transportation, -Y-69,406; construction trains, -Y-79; tools and implements, -Y-6,611; telegraph and telephones, -Y-3,834; other expenses, -Y-75,719. Total, -Y-1,341,459.

Connecting Line with Sea, Yokohama.—Purchase of land, -Y-28,404.

Connecting Line with Sea, Kobe.—*Itemization of Cost*—Location and survey, inspection and general expenses, -Y-13,542; purchase of land, -Y-668,880; earthwork, -Y-20,729; bridges, -Y-15,248; culverts, -Y-36,019; draining, -Y-3,305; permanent way, -Y-30,770; stations, -Y-934; various buildings, -Y-2,073; transportation, -Y-107; telegraph and telephones, -Y-159. Total, -Y-791,766.

PROVINCIAL HARBORS, PHILIPPINES

Improvement of the Port of Cebu.—This work was authorized by Acts Nos. 640 and 1342, which appropriated -P-1,084,000 for the purpose, and its transfer to this office by Act. No. 1339. The original project was prepared under the direction of the Bureau of Engineering and provides for the construction of a bulkhead of concrete masonry 2600 ft. long, the reclaiming of about 13 acres of land along the waterfront and the dredging along the bulkhead to 18 and 23 ft. below mean low water. The project for the bulkhead has been modified by the substitution of concrete deposited in mass for the concrete blocks of the original design. The area of the section has also been enlarged, and a vertical face given to the wall. The contract for the work was awarded to J. G. White & Company on March 30th, 1904. This contract specifies that the cement required shall be furnished by the government, and a contract was entered into January 21st, 1905, with the Alson Portland Cement Company, for delivering 30,000 bbls. of cement. 10,979 bbls. have been delivered and stored by the contractors for the work who began operations December 15th, 1904. At the close of the fiscal year there had been erected two store-houses for cement, a concrete mixer, and a railroad built about 2.5 miles in length from the Guadalupe River to the concrete mixer, which is to be used for transporting band and gravel for the work. The work has been in local charge of Mr. T. Warren Allen, Supervisor, Province of Cebu, Cebu, P. I.

The following statement of the entrance and clearance of vessels by fiscal years since American occupation has been furnished by the Collector of Customs, Philippine Islands:

CEBU, COASTWISE.

	ENTERED.		CLEARED.	
Year	Vessels	Tonnage	Vessels	Tonnage
1899	218	27,828	208	28,036
1900	1,347	100,676	1,642	104,701
1901	3,685	145,726	4,225	147,598
1902	5,008	165,485	5,263	151,850
1902	4,099	168,718	4,206	169,892
1904	2,755	193,174	2,875	196,[illegible]60
1905	2,637	191,593	2,973	191,880

CEBU, FOREIGN.

1899	14	14,419	8	9,132
1900	54	60,130	48	59,147
1901	71	91,013	75	94,780
1902	73	88,438	62	86,456
1903	118	169,257	113	68,316
1904	110	152,023	105	45,625
1905	123	166,433	112	75,174

Improvement of the Port of Iloilo.—This improvement was provided for by Acts Nos. 641 and 1342, appropriating -P-532,000 for the purpose, and the work was transferred to this office by Act No. 1339. The original project was prepared under the direction of the Bureau of Engineering and provides for the dredging of a channel in the Iloilo River to a depth of not less than 15 ft. at mean low water, the construction of breakwaters across the bar at the entrance to the river, and the construction of a system of dikes and levees to control the river flow. The contract for the work was awarded to J. G. White & Company on March 30th, 1904, who began operations in August. At the close of the fiscal year the contractors had driven 24,300 lineal ft. of piles, delivered 2300 cords of facines of which 2100 cords had been placed in the dikes, and quarried 14,500 tons of stone of which 13,400 had been deposited on the breakwaters and dikes. A 16-in. suction dredge is being constructed by the contractors who expect to begin dredging operations early in August. The work has been in local charge of Assistant Engineer W. Meadowcroft.

The following statement of the entrance and clearance of vessels by fiscal years since American occupation has been furnished by the Collector of Custom, Philippine Islands.

ILOILO, COASTWISE.

	ENTERED.		CLEARED.	
Year	Vessels	Tonnage	Vessels	Tonnage
1899	108	41,091	146	44,655
1900	312	77,837	585	82,784
1901	2,171	137,844	2,232	139,303
1902	3,553	203,290	3,584	202,012
1903	3,398	194,947	3,435	195,763
1904	3,381	184,050	3,362	132,278
1905	3,557	176,152	3,523	173,448

ILOILO, FOREIGN.

1899	24	26,865	27	35,769
1900	47	55,330	52	62,775
1901	70	77,303	75	81,585
1902	85	87,527	92	94,419
1903	105	115,843	105	115,216
1904	113	121,188	117	131,031
1905	90	128,193	93	135,046

Surveys and Investigations of Navigable Rivers.—By Act 1339 the surveys and investigations of navigable rivers and harbors will be made by this office excepting such as have been assigned by law to the Coast and Geodetic Survey. Such waterways are numerous in the Philippines and near them is found the great mass of the native population. With the ocean and seas with which they connect they form natural lines of communication over which products may be transported much cheaper than over any railroad and which for long distances will require no annual expenditure for maintenance of way. To perfect these waterways there is only required what in railroad parlance are termed terminal facilities.

While Manila with its now harbor, the Pasig river, and its numerous esteros, will soon possess facilities for water transportation equalled by few cities in the world, but little has been done by the General Government, by the Municipalities or by private interests to develop the other ends of these lines, nor does there exist reliable data upon which to base projects for improvements.

The railroad development which has been proposed may so tax the revenues of the Government as to render it inadvisable at the present time to enter into a general plan of improving waterways, but the construction of these railroads will necessitate the immediate development of the harbors from which they start.

An appropriation of -P-30,000 for making the necessary surveys and investigations for the improvement of such harbors is recommended.

GRAVITY WATER SUPPLY FOR THE CITY OF MANILA, P. I.

(Concluded from page 90)

the disposal of excavated material; building of a gatehouse and chambers and the setting of iron pipes, connections, and all other metal work; construction of walls and embankments, and lining of the entire reservoir. Under the overlying top-soil dressing, which is of shallow depth, it is believed that the excavation will be in *adobe* stone throughout. The entire embankments as supports to walls will be built of selected materials deposited in layers not over 4 in. thick, and each layer will be thoroughly compacted by watering and rolling or ramming. Embankments will start from a carefully prepared base on the rock and those that are to be covered with concrete will be made of an extra width of at least 1 ft. and afterwards dressed to finished lines.

The entire inner surface of the reservoir will be lined in the following manner:—

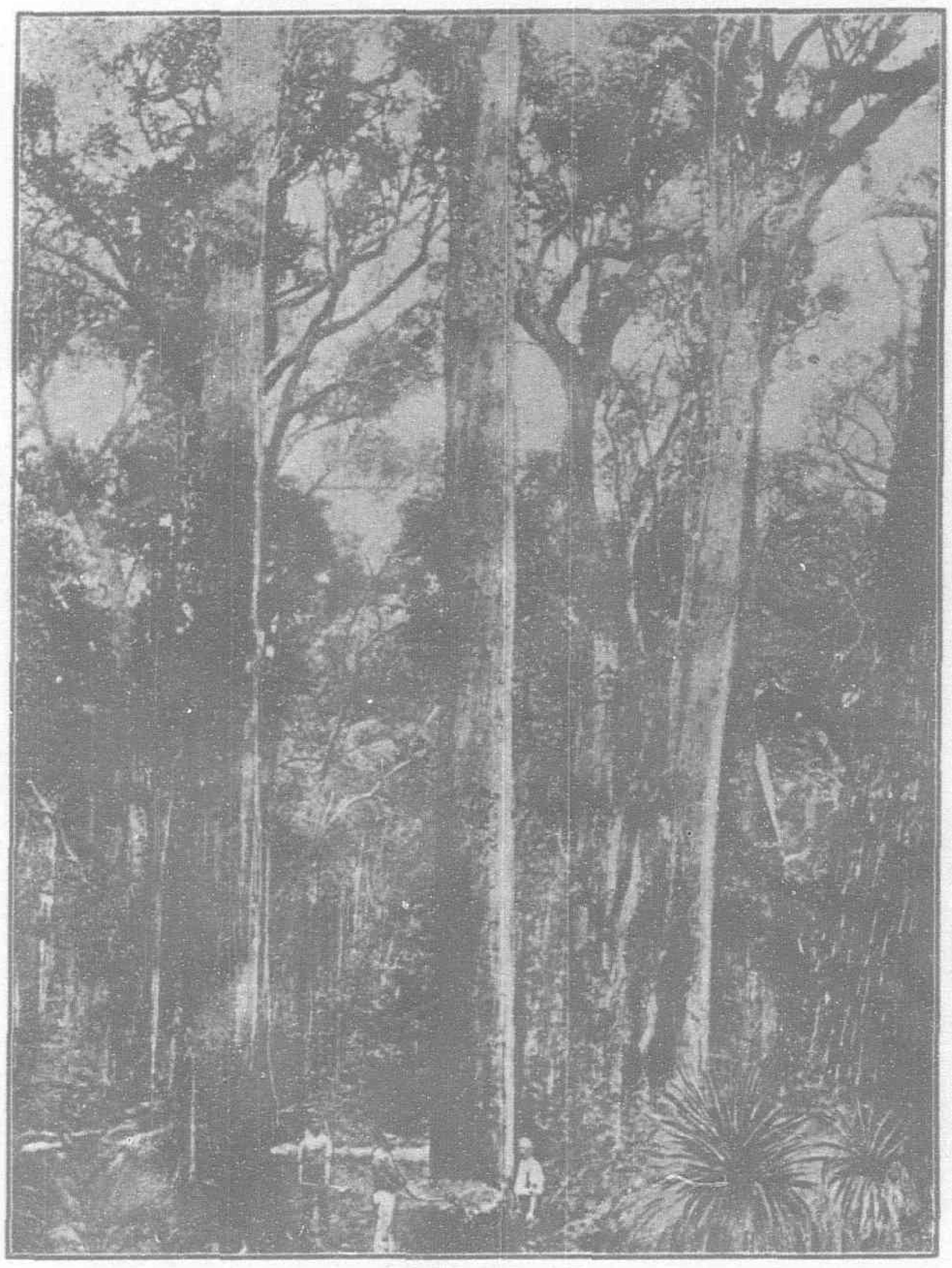
Over all surfaces in solid rock without defects a plaster coat will be applied. On all surfaces of embankments, defective rock, etc., a layer of concrete 4 in. in thickness will be placed, and this layer will be finished with a top skim coat. Expansion joints will be left in all concrete lining. Parapet walls, walks, etc., will be constructed in the proportion of 1 of cement, 2½ of sand, and 4 of broken stone or gravel.

Gatehouse.—The gatehouse will be built of pitched-faced, coursed ashlar masonry. They will begin at the level of the top of the embankment at approximately an elevation of 142 ft. Stone for the masonry will be furnished by the City of Manila and delivered at the site of the work, where it will be cut and dressed, etc., by the contractor. The city will furnish all iron and other metal work required for permanent use at the gatehouse. Roof timbers and sheatings will be of the best California redwood, and all doors, frames and wood mouldings of the first group of Philippine hard woods The principal items of iron and other metal, to be placed, are as follows:—

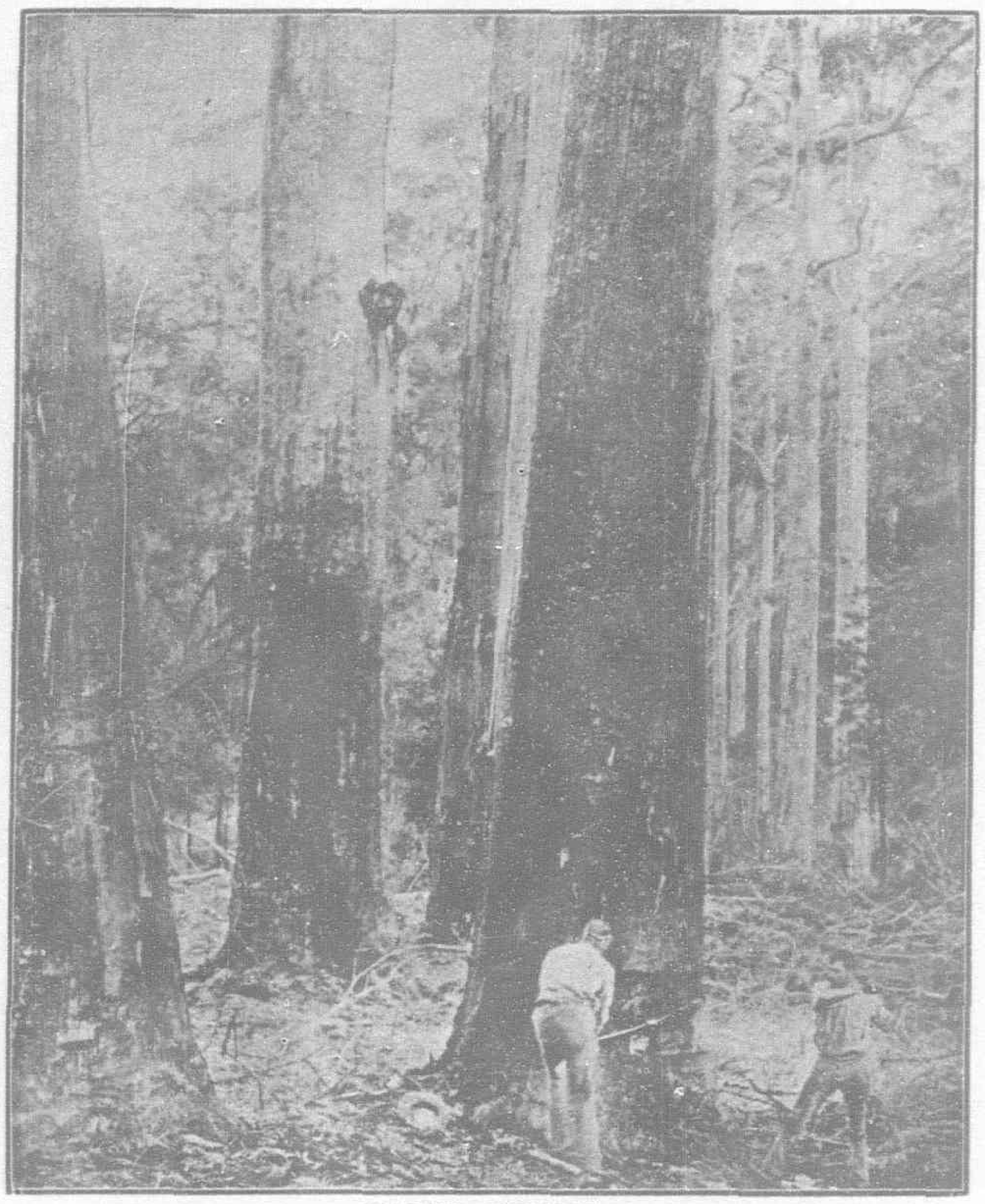
Inlet chamber screens and gratings, pipe from inlet chamber to distributing tank, distributing tank, inlet pipe to reservoir, supply pipe, waste pipes, all valves, fittings, etc., stairs and railings checkered floor plates, iron girders, crane and track, metal roofing, any other metal work shown on the plans or found necessary to be placed.

WESTERN AUSTRALIAN HARDWOODS, JARRAH AND KARRI

Report by the Late Mr. J. EDNIE BROWN, Conservator of Forests



JARRAH FOREST.



KARRI FOREST.

THE LEADING WESTERN AUSTRALIAN TIMBERS suitable for commercial purposes are the well-known Jarrah (*Eucalyptus marginata*) and Karri (*Eucalyptus diversicolor*), which are strictly indigenous to this state. Among other Western Australian timbers, however, worthy of attention are Tuart (*Eucalyptus gomphocephala*), one of the most valuable Australian woods, Red Gum (*E. calophylla*), Wandoo or White Gum (*E. redunca*), Blackbutt (*E. patens*), York Gum (*E. loxophleba*), Yate Gum (*E. cornuta*), and Flooded Gum (*E. rostrata*). These and other Eucalypts, of which there are many varieties in Western Australia, are suited for street paving, engineering (locomotive and marine), wheelwrighting, and general constructive works; and some of them, with other classes of timber, notably the Casuarinas and Acacias, may be used to great advantage in cabinet and art work.

But Jarrah and Karri, from their widely known and popular character, demand special attention.

The Jarrah forests are computed to cover an area of 8,000,000acres, and Karri 1,200, 000 acres, a total area of between 14,000 and 15,000 sq. m. These compact forest areas lie in the south-western part of the state, and are within a comparatively short distance of the coast, while the Great Southern and South Western Railway systems, with their branch lines, afford communication with the principal harbors.

JARRAH —This is without doubt the principal timber tree in the Western Australian forests; no one knowing the subject would for a moment dream of classifying it as anything else. It is predominant above all others in its extent of forest, the various uses to which it is or can be applied, the part which it is now taking in the great timber export of the colony, and the esteem in which it is held in the country. Jarrah and Western Australia are almost synonymous words, and, as this has been the case from the earliest days of the foundation of the colony, so it will now remain as long as a Jarrah forest exists. I do not mean by these remarks to disparage in the least degree any of the other commercial woods of the country, but simply to emphasize the fact that Jarrah is the principal indigenous timber of this part of the Australian Continent. There are other timbers in our forests which are equally, if not more, valuable, for their own special purposes, as I shall point out, but for general constructive works necessitating contact with soil and water, the timber of this tree stands foremost in these forests.

The specific name refers to the thickened margin of the leaves, and the vernacular is the name given to the species by the aborigines. In some districts, the tree is known to the settlers as the "mahogany gum."

Taken as a whole, there is nothing particularly picturesque about the appearance of a Jarrah tree or forest of these. Indeed, the general effect of the species, *en masse*, is dull, sombre, and uninteresting to the eye. Except in special spots and localities, the trees are rugged and decidedly inclined to be straggling and branchy. In this respect they differ very materially from the karri, which is almost invariably a fine straight tree and comparatively free from branches except at the top.

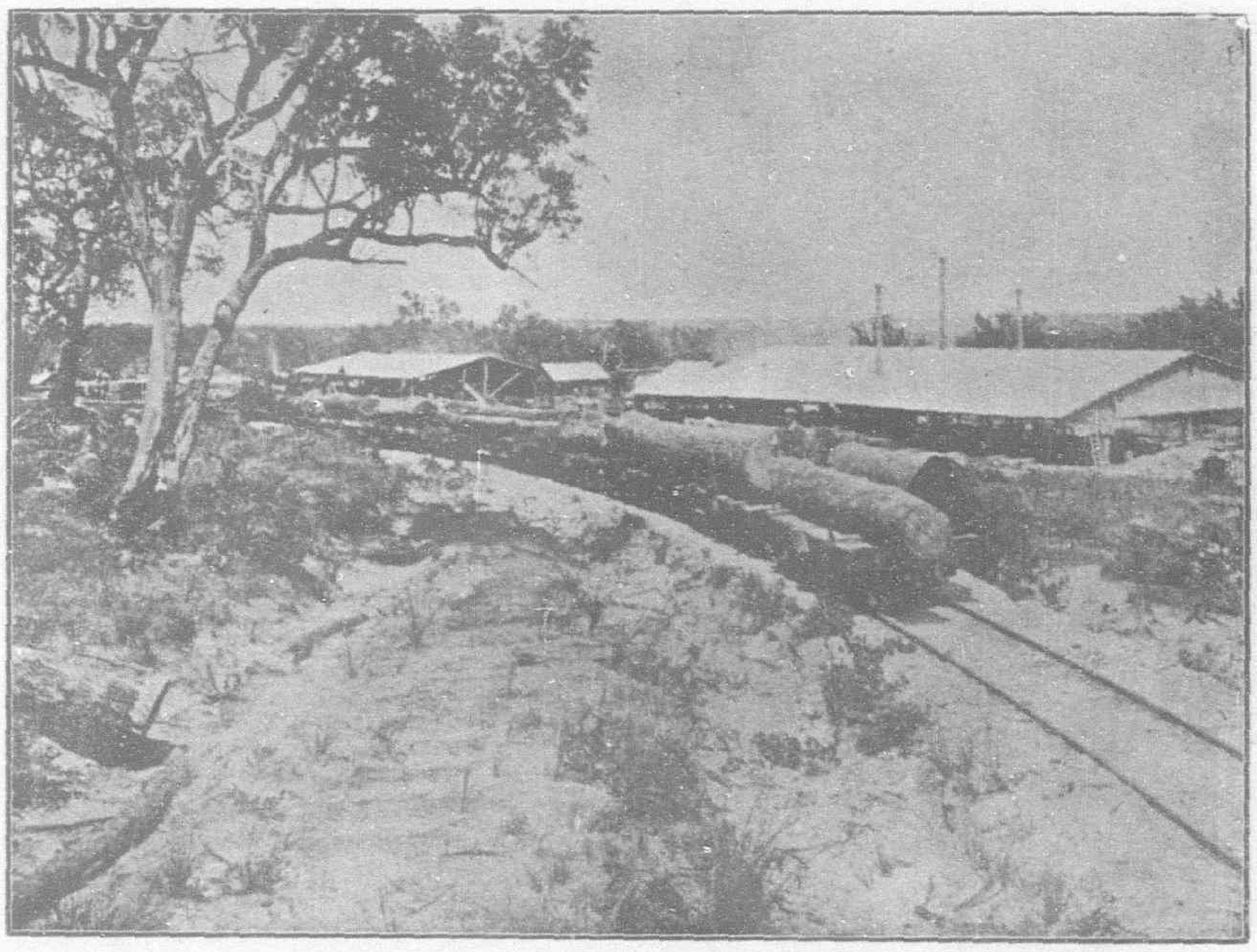
In general appearance the Jarrah resembles what is known in the other colonies as the stringy-bark. Its likeness to this division of the Eucalyptus family is very marked. The bark is therefore persistent, fibrous, and of a dark grey color, although more deeply indented in its longitudinal furrows than the true stringy-bark.

It is not uncommon to find considerable areas of Jarrah forest where many of the matured trees attain heights of from 90 ft. to 120 ft., with good stems 3 ft. to 5 ft. in diameter, and 50 ft. to 60 ft. to the first branch. Such places would be described as first-class Jarrah forest. Taking an average, however, of these forests, I think a Jarrah tree of a good healthy stamp and one representing a fair specimen of its kind, would run about 90 ft. to 100 ft. in height, and from 2½ ft. to 3½ ft. in diameter at the base. Under such conditions and in fairly favorable situations, trees of this size might be expected to be sound and convertable into good marketable timber without much waste.

Of course, in places there are individual trees to be met with the measurements of which run into figures far in excess of those just mentioned, and one or two of these may be cited as indicative of the possibilities of the tree as regards size and wealth of timber. One, about three miles west of the old Welllington Mill upon the Ferguson River, measured 22 ft. in circumference at 5 ft. up from the ground antd 80 ft to the first branch. It is a fine, sraight,. handsome tree, apparently perfectly sound, and would turn out at least 20 loads of good sawn timber. Another large specimen on the Ferguson area went 21 ft. in circumference at 4ft. from the ground, and 75 ft. to the first branch. And yet another, this time in the Ironpot area; this measured 22 ft. in circumference at 4 ft. up, and 60 ft. to the first limb. These few instances of the actual measurements of lareg Jarrah trees will show to what an immense size the species will sometimes attain, under what must, of course, be favorable circumstances.

As regards the age of the tree when it has attained a diameter of about 2 ft., or has reached that stage when it may be considered fit for the saw mill, I have gone carefully into this question by having trees cut down and their concentric rings counted, and have come to the conclusion that in good situations it will attain this size when about 40 or 50 years of age.

So far as my observations have extended, the Jarrah is confined in its distribution to what is known as the South-Western Division of the colony, and this, I understand, is practically its geographical limits. On reference to the plan attached, it will be seen that this district lies along the western coast of the colony, between latitudes 31 degrees and 35 degrees south and longitude 115 degrees and 119 degrees east. This means a scope of country



MILLARS' KARRI & JARRAH CO.—PRIVATE RAILWAY

extending nearly 350 miles running north and south, and from 50 to 100 miles east and west, and embraces all that portion of the country upon which the heaviest rains of the season fall, which averages 40 in. in the south and 35 in. in the north. An average of 10 years shows the rainfall of this, the timbered district of the colony, as 38 in.

The Jarrah is purely a semi-coastal tree, by which I mean that it is not found anywhere strictly beyond the influence of the sea, and yet is not at all partial to the direct effects of the sea-breezes. Perhaps the best forests of the species are found from 20 to 30 miles off the coastal line. Whether this fact is only co-existent with the heavy rainfall district, and that, with an equal rainfall more inland, the result of growth would be equally as good as along the coast, I am not prepared to say.

The principal habitat of the tree is therefore along the table-lands and slopes of the Darling Range, which runs through nearly the whole of the South-Western District. Perhaps the best areas of Jarrah lie along that portion of this range from the Blackwood River north to the Helena River, with the choicest portions midway between these two points.

In all cases this tree delights in an ironstone formation, and it would almost appear as though the rougher and the more the site is composed of Ironstone rocks and barren of almost any other vegetation, the better the tree will grow. It is certainly beyond a doubt that, under such circumstances, the timber attains its greatest degree of soundness, strength, and general durability. There are, it is true, some fine belts and patches of Jarrah forest to be found upon many of the lower-lying portions of the district referred to, where the geological formation of these is composed of ironstone—as for instance in the country lying between Quindalup and Karridale—the timber is good in every respect.

It is indeed asserted by some and denied by others that the timber grown on the flats is superior in its lasting qualities to that grown on the hills, but this wants further verification before being accepted as a fact. I may, however, state that I have seen some specimens of the timber which had been cut from trees grown on the flats, which were in an apparently sound condition after having been in the ground and water for over 40 years.

It is very marked that so soon as a granite formation comes in, so sure will the Jarrah forest fall off to a mere scrub, if it does not disappear altogether. This is a well-known fact to those who have travelled through these forests.

We find Jarrah all over the South-Western Division and almost invariably intermixed with red gum, and in places with the blackbutt as well, the latter always in the hollows and richer portions of the district. In some parts of the karri country, to which I shall more particularly refer later on, the Jarrah appears to mix with the former, except in places where the karri takes possession of the ground to the exclusion of all others. It is, however, a fact that in almost all cases the Jarrah is to be found, if not exactly intermixed with the karri, at all events in close proximity to it. This is an important fact, which should be of advantage to intending exporters of our timbers.

The late Baron Sir F. von Mueller, the great and well known botanist of Victoria, said "the Jarrah is famed for its indestructible wood, which is neither attacked by the borings of the Chelura, Teredo, nor Termite."

Its resistance to white ants is remarkable and houses built of the wood when thoroughly seasoned are almost indestructible and have been known to exist in perfect preservation for nearly 100 years. It gets extremely hard with age and then becomes almost unworkable, even strong nails cannot be driven into it and when struck the wood rings like a bell. Altogether, it is a remarkable timber and highly suited for outside works. Should any decay or destruction have occurred in the timber after having been years in use, it will always be found that this is confined to the sap-wood; which therefore ought always to be avoided in the construction of houses or in other works of a permanent character.

Unfortunately, sufficient attention is not always paid to the seasoning of the timber and hence disappointment sometimes ensues. When used as flooring boards, it should specially be thoroughly seasoned, otherwise there will be much warping, buckling, and an unsatisfactory floor altogether; if seasoned before being laid, however, a better floor could not exist.

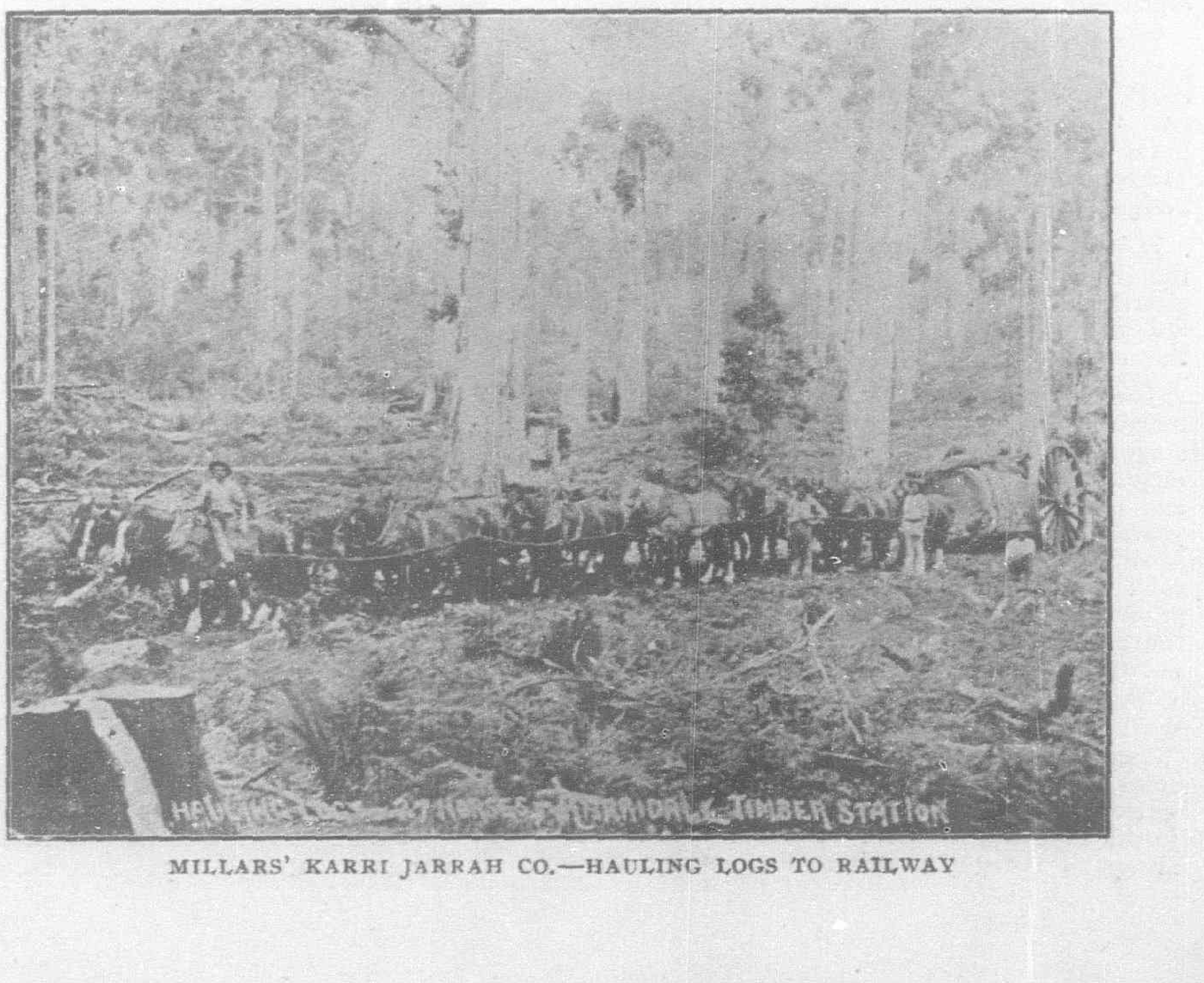
Much has, of course, been said and written about this timber, but it is not my intention to wade through these details and give the results here; suffice it to say that it is one of the most valuable of Western Australian timbers, and the best known of all Australian timbers.

My own opinion of it is that it is one of great excellence, and may be looked upon as one of the principal timbers of Australia for general constructive purposes. I have been shown many specimens with surprising records of durability in the ground and in water, salt and fresh, and these of themselves testify to its wonderful excellence. I have, however, observed also that this timber is variable in its chief attractive properties, and that it is sometimes less durable than at others. This no doubt is accounted for by cutting at the wrong season of the year, by the character of the soil upon which it is grown, and other specific peculiarities.

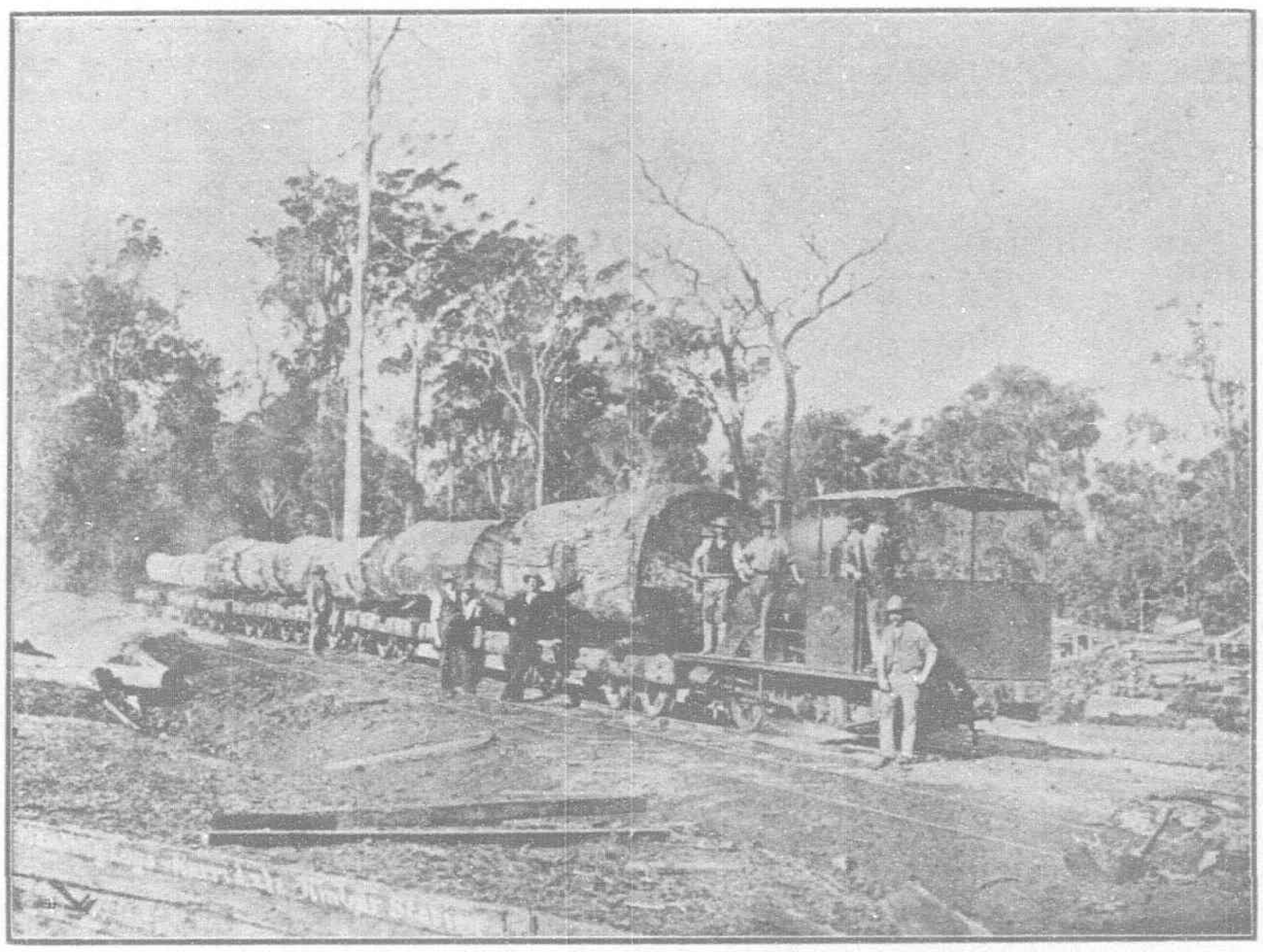
The weight of the wood, when newly cut, is a little over 70 lbs. per cub. ft. which is reduced to 60 lbs. when thoroughly seasoned. It is red in color, polishes well, and is comparatively easily worked.

Some of the principal uses to which it is as yet applied are as follows:—Wood-blocking, piles, jetties, bridges, boatbuilding, posts, furniture and railway sleepers. It makes the best charcoal of any timber in the colony. Its adaptability for all kinds of out-door work is well known, and hence it is considered the staple timber of Western Australia.

The suitability of the timber for piles or any works requiring immersion in salt or fresh water has been practically noted and is worth recording. In this office there are specimens which have been obtained from piles and girders 60 years old. These were driven and used in local harbors and bridges. When obtained for the department, the timber appeared to be perfectly sound and free from any signs of decay whatever; if anything the wood seems to be harder, more solid and apparently more



MILLARS' KARRI JARRAH CO.—HAULING LOGS TO RAILWAY



MILLARS' KARRI & JARRAH CO.—LOADING LOGS FOR MILL

durable than freshly-cut timber. At all events, it seems capable of standing wear and tear for 100 years longer. From its immersion in water, it certainly appeared darker in color compared with newly-cut timber, but no decay whatever is apparent. Pieces of this wood have been converted into cups, card cases and other articles, and the polish which they have taken on is equal to, if it does not surpass, the finest old mahogany.

The records of this timber having lasted in the ground as fence-posts are almost without number, and need not therefore be particularised here.

There are instances of railway sleepers which were laid down 18 years ago and still appear as sound as ever.

KARRI.—This is the giant tree of Western Australia, if not of the whole Australian Continent. The latter remark is, however, disputed, but the assertion is made without much fear of contradiction. It comes, at all events, next to be considered as one of the principal timber trees of this colony. It is not so well known as the jarrah, owing to the limited field of its growth and the, at present, comparative inaccessibility of its haunts. I now give some particulars of the species.

The late Baron von Mueller was the first to give this tree its specific appellation (*diversicolor*), and this we are told by him bears reference to the paleness of the leaves upon their lower side, compared with eucalypts generally. The common or vernacular name is the aboriginal designation of the tree.

It is of some botanical interest to note that this tree was known for some time as *E. collosea*, referring no doubt to its enormous height, but this has been abandoned in preference to the one which it now bears.

There is much to be said in favor of this member of our forest flora. In its young stage it can hardly be beaten as a highly ornamental tree, being regular in its growth, straight, and umbrageous, its leaves changing in a few years from being of an oval shape to those long broad ones which mark its more matured condition. I consider that in this respect, and its general appearance as well, it resembles greatly the sugar gum of South Australia (*E. corynocalyx*).

There is no doubt that this is the finest and most graceful tree in the Australian forests. When matured, and has attained large dimensions, its appearance is simply grand in the extreme, and in this respect at least puts the jarrah far into the shade. The trees are almost always of straight growth, and tower skywards for great heights without having even the semblance of a branch. So marked are they in these respects that they look like a mass of upright candles.

The bark is smooth, yellow-white in appearance, but not persistent like the jarrah. It, therefore, peels off in flakes each year, and thus the tree has always a clean bright appearance. In consequence of this, it is frequently spoken of as a "white gum," although generally known as the Karri.

The height of these trees is almost phenomenal and present astonishing productions of nature. As a rule, an average tree may be put down at 200 ft. in height and 4 ft. in diameter at 3 to 4 ft. from the ground, and about 120 to 150 ft. to the first branch. Trees of this size are generaly sound in every respect, and may be expeeted to turn out timber free from the usual blemishes of dry rot, gum veins, &c., to which large trees are usually subject.

Trees of the size indicated are what one usually meets with in the Karri forests, but much larger specimens are, of course, run against now and again. For instance, on the Warren River, it is not unusual to meet with trees which go 300 ft. in extreme height, over 180 ft. in height to the first limb, and from 20 to 30 ft. in circumference at the base. Of course, these are exceptional cases, but still they do exist.

The finest tree of this kind which I came across during my trip was at Karridale (M. C. Davies & Co.). This is called "King Karri," and the following are some measurements taken in connection with this great specimen:—

34 ft. in circumference at 3 ft. from the ground.

160 ft. to the first branch.

14 ft. in circumference at the first limb.

Over 200 ft. in extreme height.

From these figures it will be seen that the bole of this tree from the bottom to the first limb contains nearly 6,000 cub. ft. of timber. This means a weight of over 40 tons in all; that it would take one of our ordinary mills at least four days to convert it into sawn stuff; and that it would form about a quarter of the loading capacity of one of the ships which form the fleet of our present export timber trade. These figures speak for themselves, and need no comment. I question if there could be found appliances in the colony at the present moment to deal with this forest monarch. Similar cases might be cited, but this one will give a fair idea of the enormous dimensions to which this tree sometimes attains.

The Karri is a very rapid grower, and soon attains a great height and considerable dimensions of timber. I had several cut down with the object of counting the concentric rings in the wood, and of making some measurements and observations in regard to the species generally. The following may be taken as an average of these:—

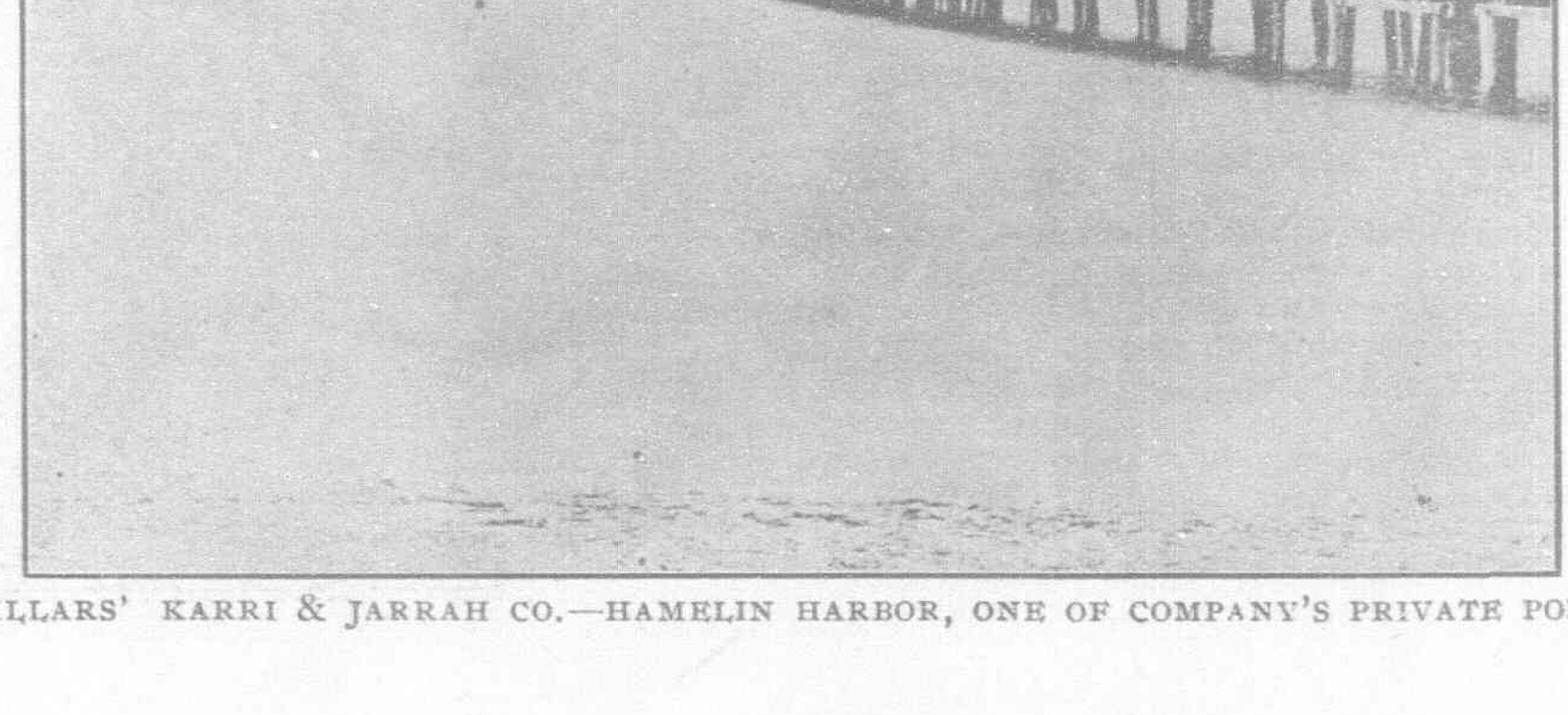
A tree on the track from Giblet's to the Vasse road was felled. It looked like a sapling in comparison with the surrounding members of the forest.

The measurements, however, were:—

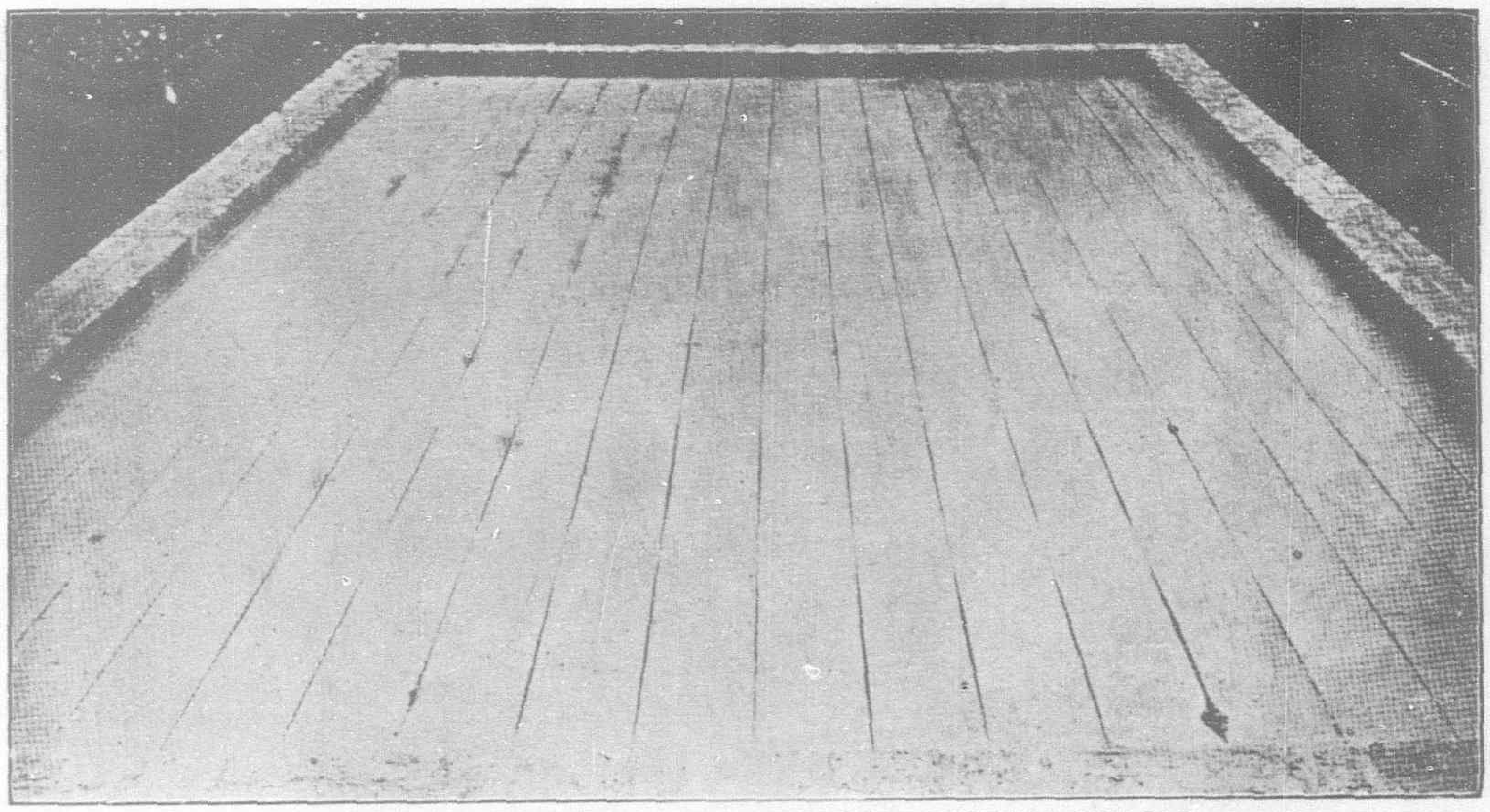
Height of whole tree...................... 153 ft.
Height to top of available timber..... 100 ft.
Thickness of bark......................... ½ in.
Diameter at 2 ft. 7 in. from the ground... 1 ft. 11 ½ in.
Age of tree, judging from the concentric rings, 35 years.
Contents of tree, say 175 cub. ft. of timber.

We thus see that a forest of marketable Karri can be produced in the short term of from 30 to 40 years.

It is certainly a matter of local record that some years ago a resident on the Warren lived and partially raised a small family in the hollow of one of these fallen monarchs. It appears that the tree was hollow and fell, and was afterwards further worked out and lined by the enterprising settler as a dwelling for his family until such time as he was in a position to build the modern edifice which now stands not far from the site



MILLARS' KARRI & JARRAH CO.—HAMELIN HARBOR, ONE OF COMPANY'S PRIVATE PORTS



KARRI FLOOR AFTER FIRE TEST AND AFTER REMOVAL OF LOAD.

or remains of the primitive habitation. The old tree was destroyed and effaced from the place by a recent bush fire. This specimen was said to be over 300 ft. in length and some 12 ft. in diameter at the base.

The Karri is strictly confined in its range of locality to the south-western portions of the great South-Western Division of the colony, or that part of the latter lying between Cape Hamelin on the west and the Torbay Estate, near Albany, on the east. Its geographical confines are embraced within longitudes 115 degrees and 118 degrees east, and latitudes 34 degrees and 35 degrees south.

In some instances we find the tree fairly close to the sea-coast, but in such cases it is scraggy, stag-horned and branchy, and therefore not a desirable specimen for the saw mill, or readily convertible into timber for marketable purposes. Still, it is, undoubtedly, essentially a coastal tree, but yet shy of actual contact with saline particles or of strong direct sea breezes. In this respect, it perhaps also resembles the jarrah, if not the eucalyptus family generally.

In that portion of the Karri area south of the Blackwood River, the country consists of knolls and belts of red chocolate, or partial ironstone-humas soils. Around these eruptions or hills, there are low-lying parts, valleys, or swamps, which usually consist of deep vegetable debris soils, and covered with the usual tea-tree, banksias, and low eucalypti scrubs, backed up by a low inferior scrubby class of jarrah, which gradually intermixes and merges with the Karri.

As a rule, I found that in the Karri country the jarrah is subservient to the former, and therefore is inferior in every physical feature tending to natural competition as a timber tree.

Of course there are ranges and table-lands of this country which dissociate themselves from these remarks, but as a rule the latter are fairly correct.

Again, I found that the soil of the Karri belt at Karridale, or that lying between the Blackwood and the coast of Cape Hamelin, is of an entirely different nature to the other, being of a limestone formation, with the limestone on the surface, and the soil of a sandy calcareous kind. This, so diametrically opposite to the other, is a very remarkable phytological fact for future examination.

From aneroid readings, I found that the best Karri forests (that is as regards size, soundness and health of individual specimens) are to be found at elevations of from 300 to 600 ft. above the level of the sea. This I found a fairly correct observation applicable to the whole area.

Of course, in a large area of forest country such as I am now referring to, there are certain parts better than others as regards all of their natural features and surroundings, and, therefore, in coming to a conclusion as regards the best Karri forests which I have seen, I cannot but say that this is upon the Warren River, within a radius of some five or six miles of Mr. Brockman's homestead.

This, undoubtedly, is the best home of the tree, and although there may be places where there are larger members of the species, to my mind the ranges and plateaus upon the Warren River contain the best forests of this remarkable tree.

At Denmark, the property of the Millar Company, the forest of the tree is certainly very fine, and is perhaps more continuous than anywhere else; but the trees are not so high, individually, as those on the Warren.

Karridale, the concession of the M. C. Davies Company, contains some excellent timber of the species, and has the honor of possessing the largest tree of the kind represented in this report. The trees here are certainly of a high-class order in every respect, and will hold their own as regards general possibilities.

The timber is red in color, and has very much the appearance of jarrah; indeed, so like are the two, that it takes a good judge of both to distinguish each. It is hard, heavy, elastic, and tough, but does not dress, nor can it be wrought, so easily as its contemporary.

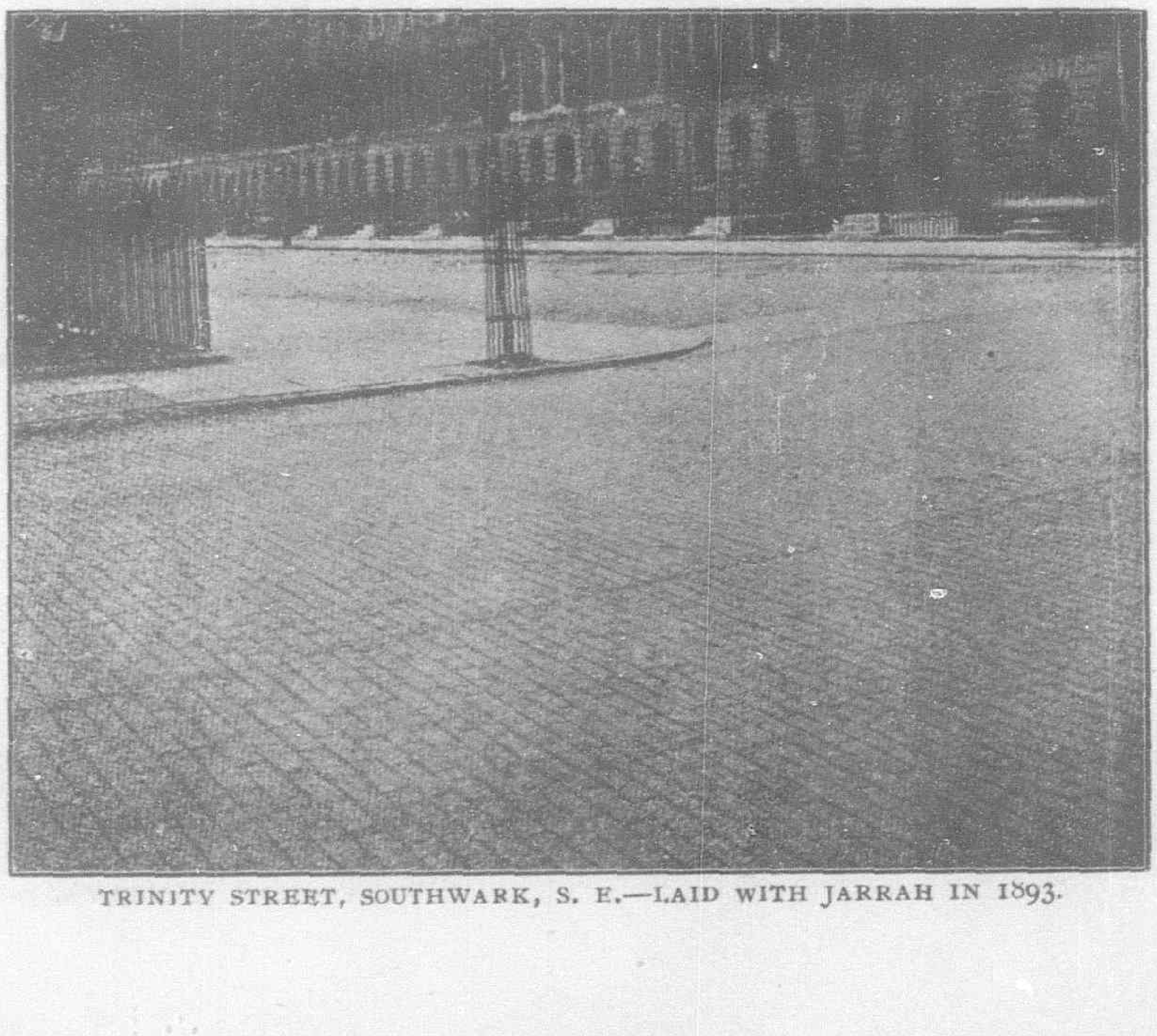
It is said that for underground or waterworks the timber is certainly inferior to some other kinds, especially to that of the jarrah, and there can be no doubt about this fact, which has been demonstrated time after time in this colony. And still it is only fair to say that instances have been brought under my notice where posts and slabs of the timber have been known to have been in the ground for 30 and 40 years with only an ordinary amount of decay. This is certainly very puzzling, and makes one doubtful in regard to the conclusions generally which have been arrived at in regard to this timber.

However, as may be seen from the comparative tests which have been made in regard to its tensile, crushing and breaking strength, it stands as a timber of a very high order indeed. We must, therefore, pending other and more general experiments, look up on the Karri timber as one best suited for superstructural works.

For bridge planking, shafts, spokes, felloes, and large planking of any sort, flooring, general wagon work, beams, it is unequalled in this colony.

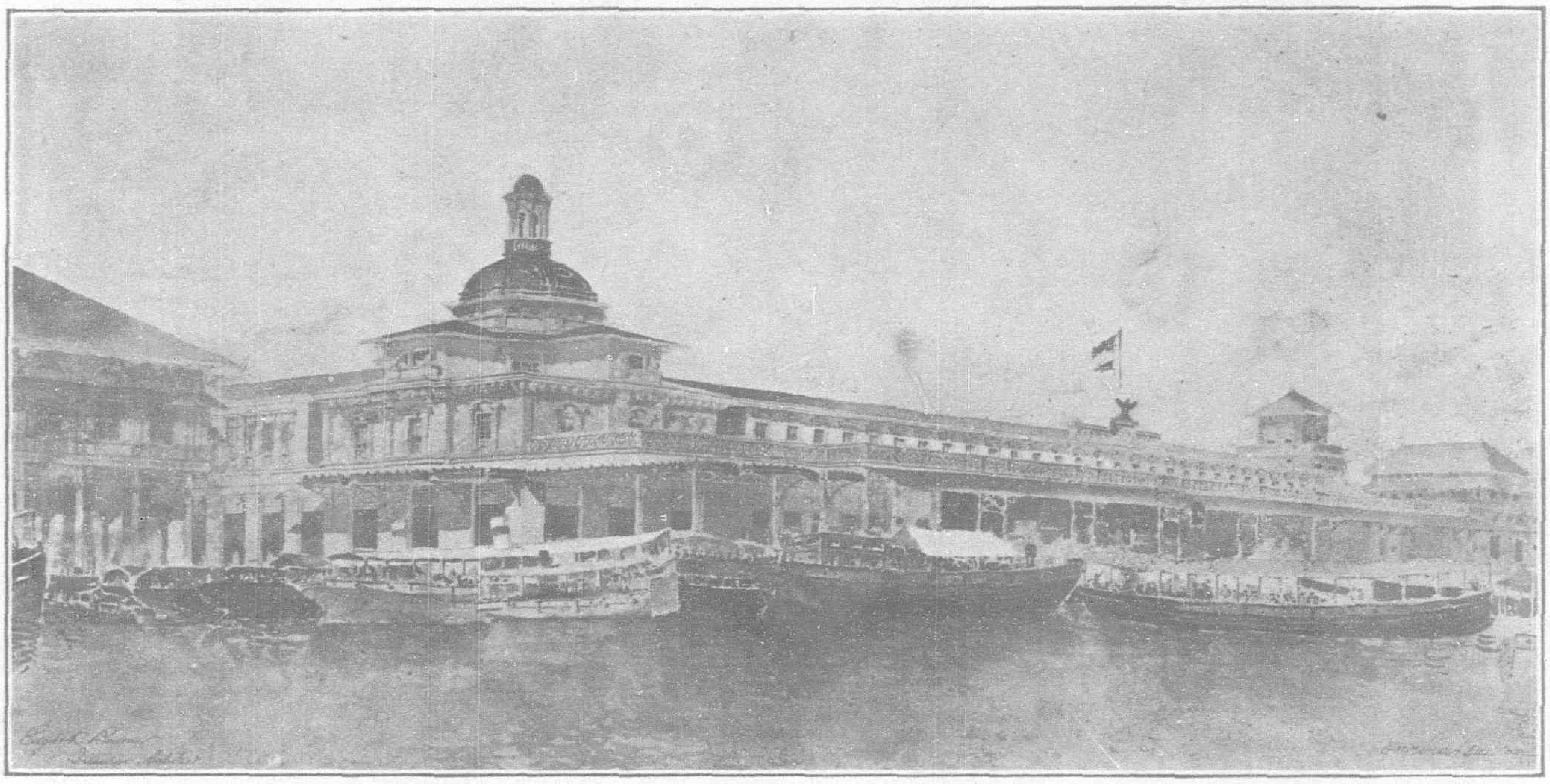
In lateral strength it is very much stronger than jarrah, and for works requiring the bearing-up of considerable weights, such as bridges, floors, rafters, beams of various kinds, it is of great value. In our railway sheds, the wood is now much in use for the construction of wagons of all sorts. It shrinks laterally but not to any great degree in a longitudinal direction. Altogether the timber is a most valuable one.

For street blocking it is most valuable, and for this purpose seems to be equal to, if not better, than its colleague, the jarrah, in that its surface by the wear caused by the traffic does not render it so slippery for the horses' feet. As is well known, this timber is now largely exported for the London street paving. It is also finding a ready sale in South Africa, for mining purposes chiefly.



TRINITY STREET, SOUTHWARK, S. E.—LAID WITH JARRAH IN 1893.

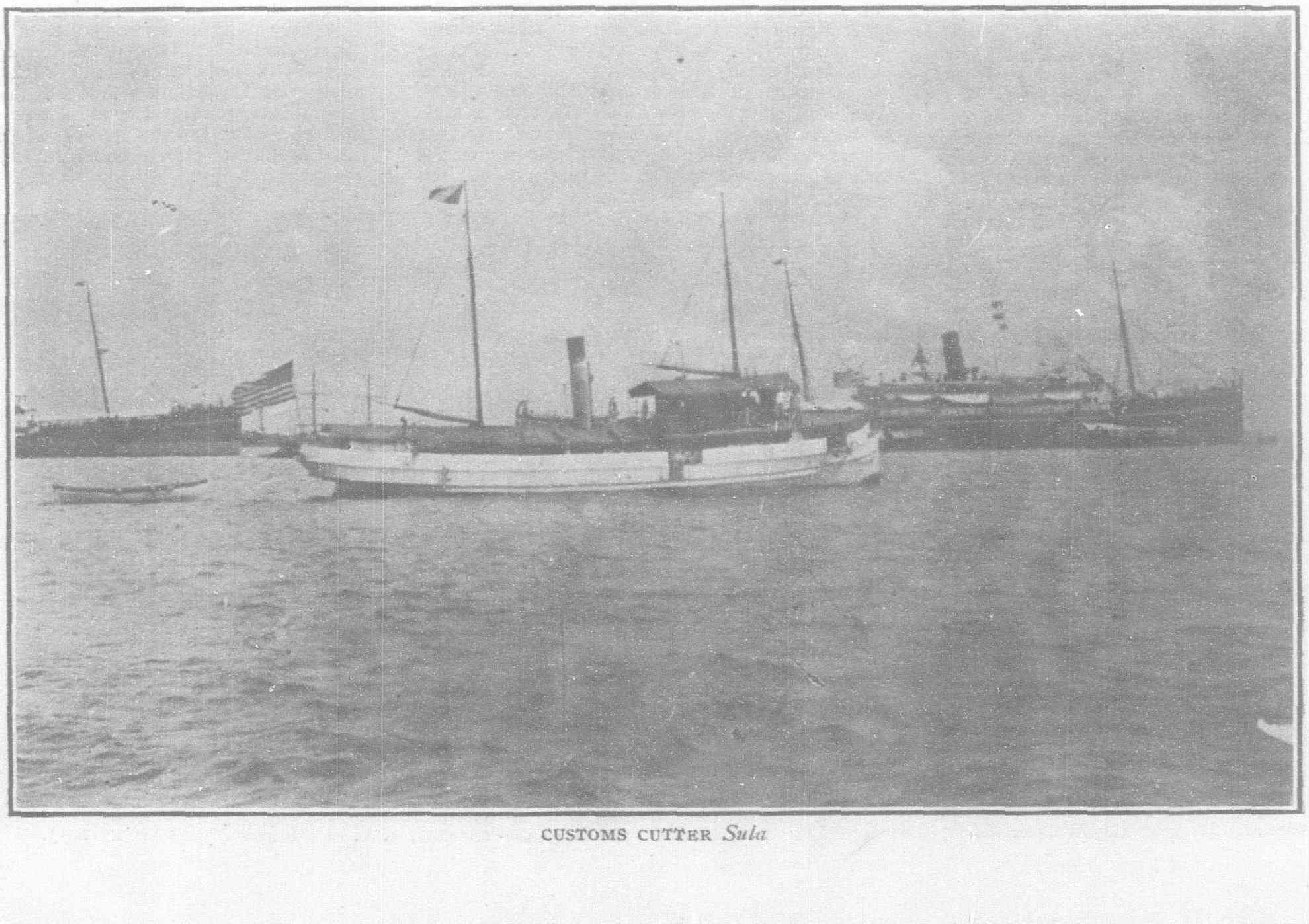
HANDLING MERCHANDISE AT THE MANILA (P. I.) CUSTOM HOUSE



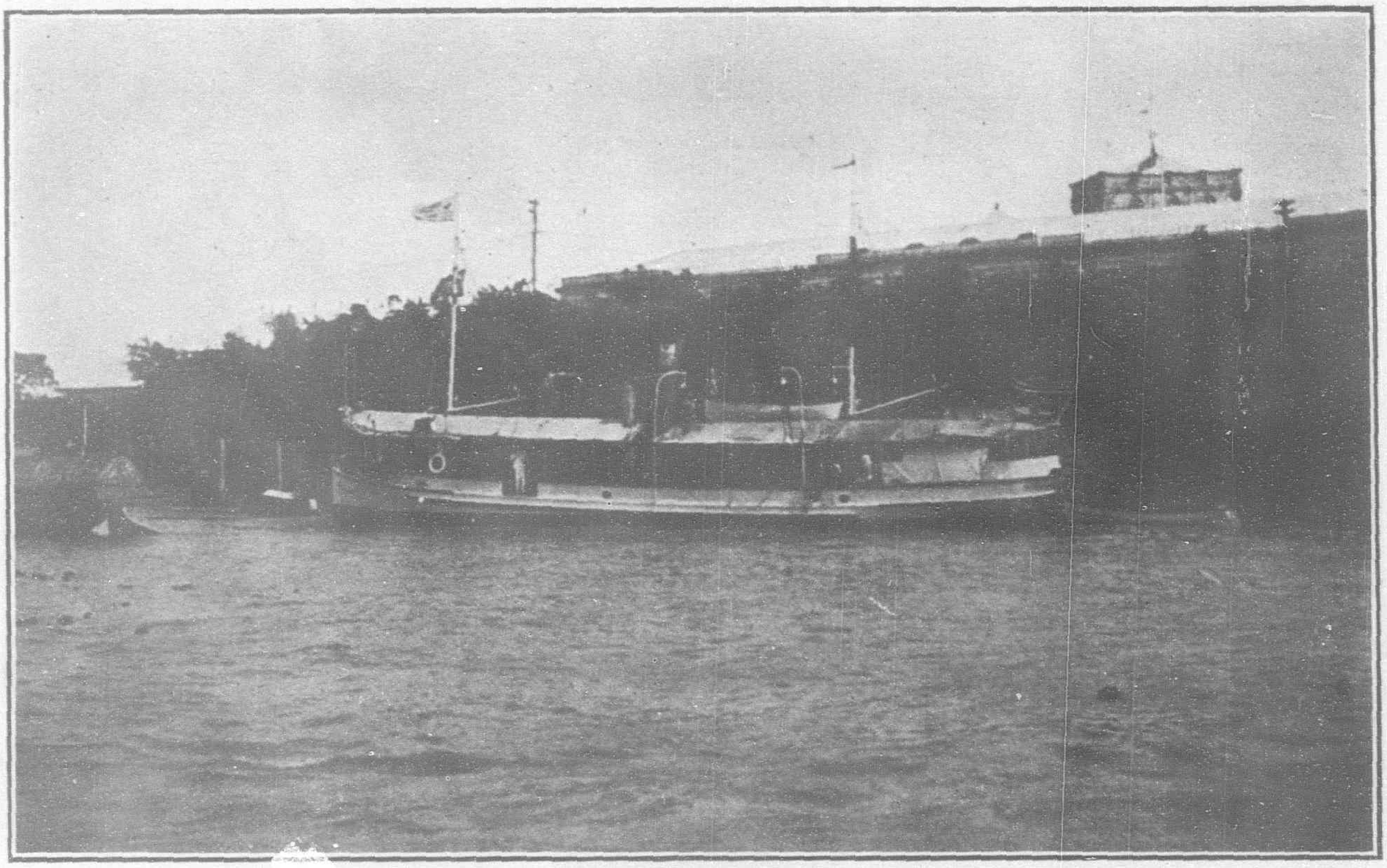
MANILA CUSTOM HOUSE

When the Philippine Government purchased the arrastre system at the Manila Custom House, in 1903, the object was to remedy the bad conditions which then and formerly existed there in regard to the delays, expense, and difficulty in discharging imported merchandise, whereby steamships were subject to great demurrage and importers to exactions and annoyances. The results accomplished, according to Mr. Clifford D. Ham, Deputy Surveyor of Customs, in charge of the "transportation of goods from one place to another," which is the meaning of the Spanish word *arrastre*, have been, in brief: (1) Ships have saved demurrage; (2) a better and more expeditious service has been given at the Custom House wharf and warehouses; (3) importers have saved much expense; (4) breakage of goods due to rough handling has been reduced to the minimum; (5) the service has been self-sustaining, and has in addition refunded the entire cost of the plant to the government. This cost was -P-39,000.

ADDITIONAL SERVICE GIVEN.—Although the arrastre rate was temporarily retained by the government at -P-1 50 per ton, much additional service was given for the same charge. Previous to the assumption of the arrastre by the Custom House the service consisted of the conveyance of the merchandise from the Custom House wharf to the warehouses and the storing therein. It ended at this point. The merchandise had been stored more or less indiscriminately, neither a ship's cargo nor individual consignments being kept together, but scattered through two, three, or more warehouses. When delivery was desired the consignee was compelled

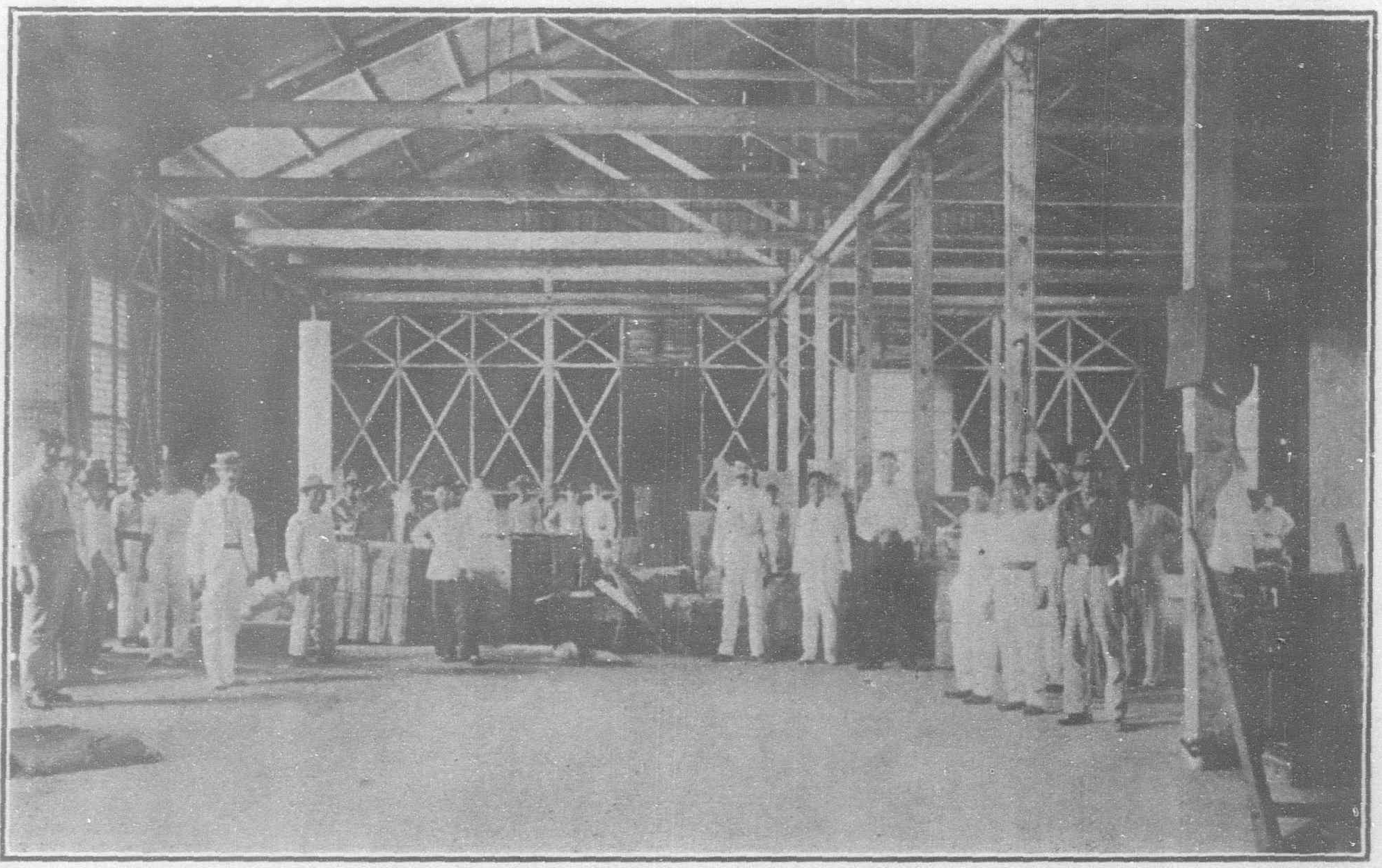


CUSTOMS CUTTER *Sula*

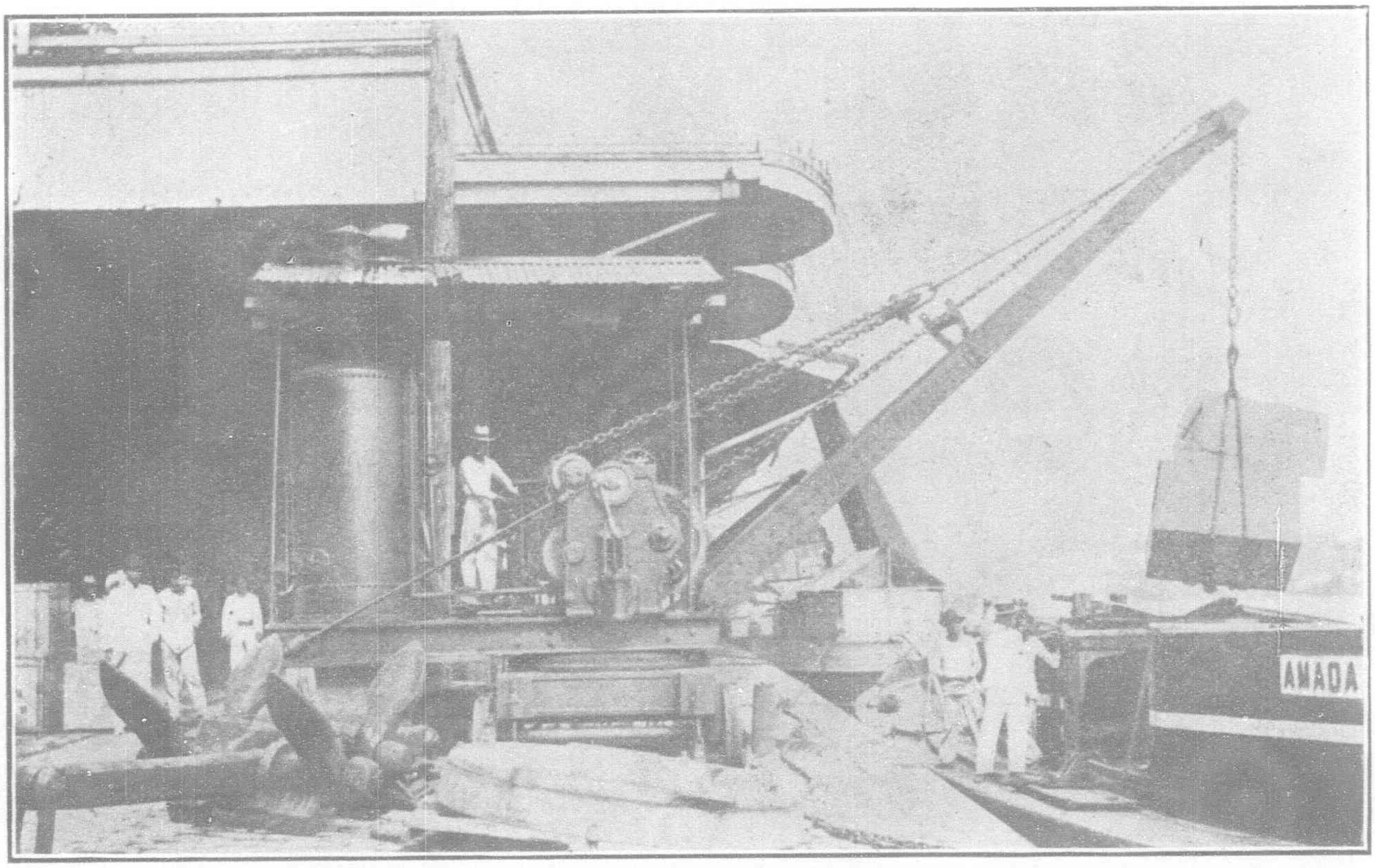


CUSTOMS CUTTER SEAGULL

to hunt out his goods, carry them out of the warehouses and put them on his carts. He was also hampered in other ways. All this work is now done by the Arrastre Division. It is estimated that this reform alone under the old charge effected a saving of about -P-41,000 a year to the importers. The charge of -P-1.50 per ton having yielded net profits the first year of the government's control of the arrastre, it was decided in 1904 to reduce the rate by 16 per cent—from -P-1.50 per ton to -P-1.25 for warehouse deliveries, and from -P-1 to -P-0.90 per ton for wharf deliveries. This reduction saves the importers over -P-22,300. It is estimated that altogether the taking over and operation of the arrastre service by the Custom House saves the importers something like -P-108,600 a year of the expense to which they were formerly subjected to, as follows: Pasé deliveries, -P-37,000; wharf deliveries, -P-8,300; warehouses deliveries and handling of small packages, -P-41,000; reduction of rate to -P 1.25 and -P-0.90, -P-20,000. Total, -P-108,600. The importers have also saved some other expenditures, especially demurrage on lighters, which can not well be computed, and it is believed have been given a greatly improved and more expeditious service, and freer from liability to breakage, than they ever enjoyed before. Moreover the saving of demurrage to steamships coming to Manila has been very considerable. It is not only a saving to the shipping of Manila in actual money, but it is a reform that wipes out an evil which



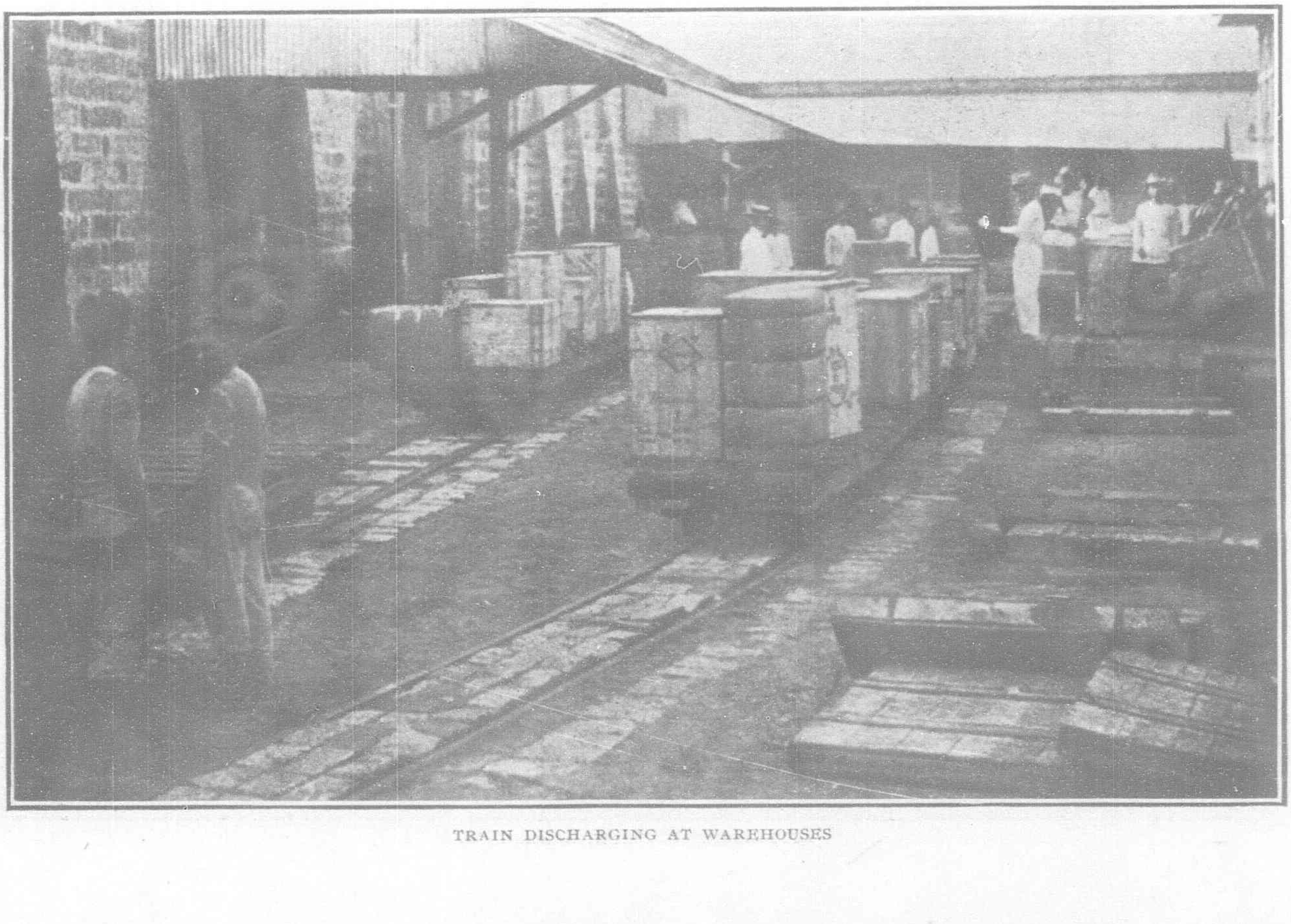
APPRAISERS' DIVISION, BODEGA "O."



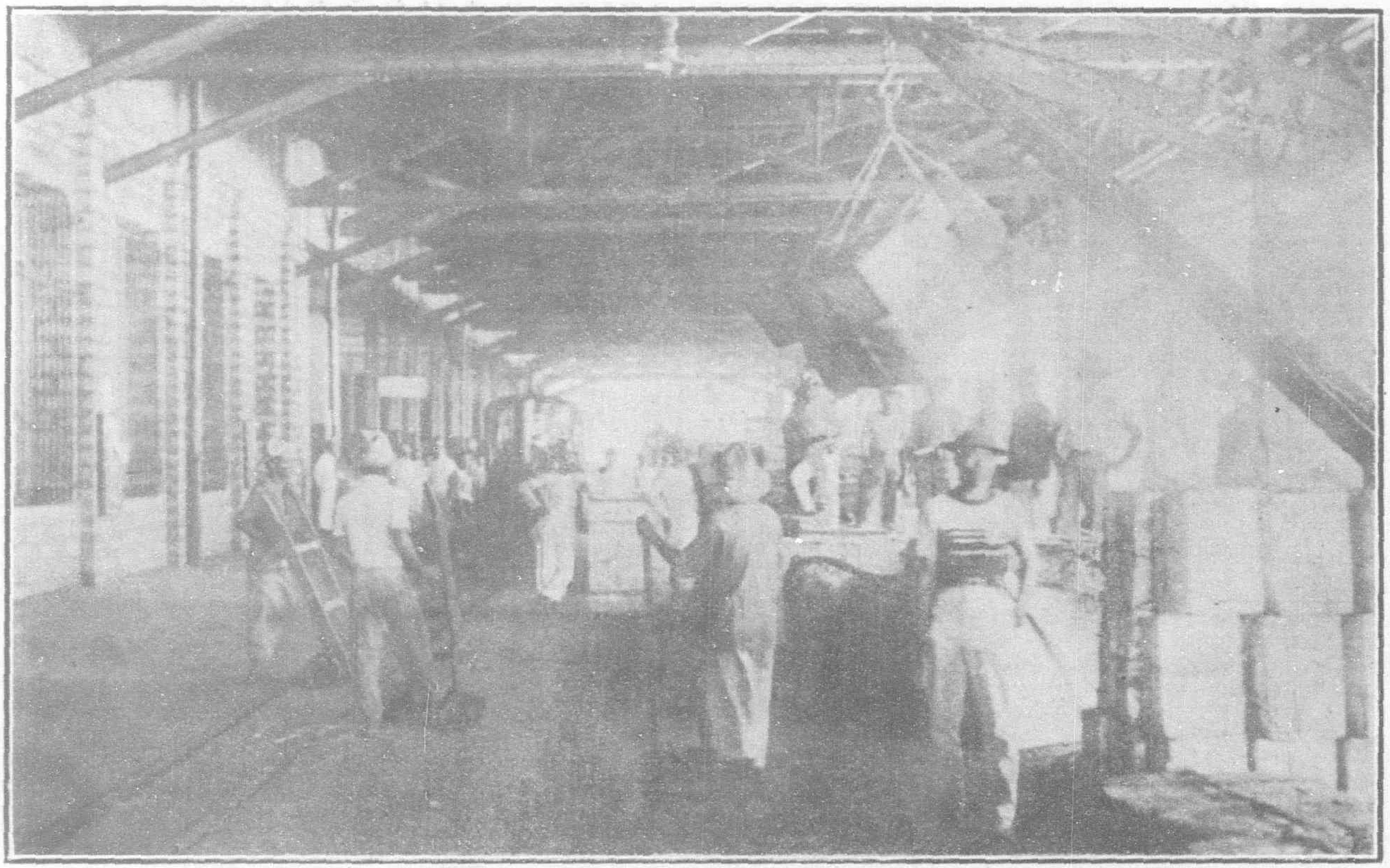
CRANE DISCHARGING FROM LORCHA

contributed much in former years to giving a bad name to this port and to hampering the commerce of the Philippine Islands.

IMPROVEMENTS TO PLANT.—The plant of the arrastre system has been much improved. The locomotive in use on the tramway, a French engine of old style, being unable to haul the traffic, a new American locomotive of latest design and double the capacity has been purchased. It has the distinction of being the first American locomotive to be introduced into the Philippine Islands. The light rails of the main line of the tramway have been replaced with heavy steel rails. New tracks and switches have been laid, increasing the trackage 50 per cent and vastly improving the facilities. A firm roadbed paved with cobblestone has been constructed. Board runways with receiving and delivery platforms have been built in five warehouses, and a sixth is now being likewise improved. A track has been constructed through the appraiser's stores for the conveyance of samples direct from the warehouses. The warehouses have all been supplied with hand trucks, which the Filipino laborers handle quite well, contrary to the expectation of many. The steam cranes and other machinery have all been repaired and put in good condition. About half the customs wharf has been repaved by the Arrastre Division, and quite a number of minor improvements have been made to facilitate the work. Altogether P-13,784.42 has been expended on additions and improvements to the plant in materials, besides considerable labor.



TRAIN DISCHARGING AT WAREHOUSES



HANDLING MERCHANDISE ON CUSTOM HOUSE WHARF.

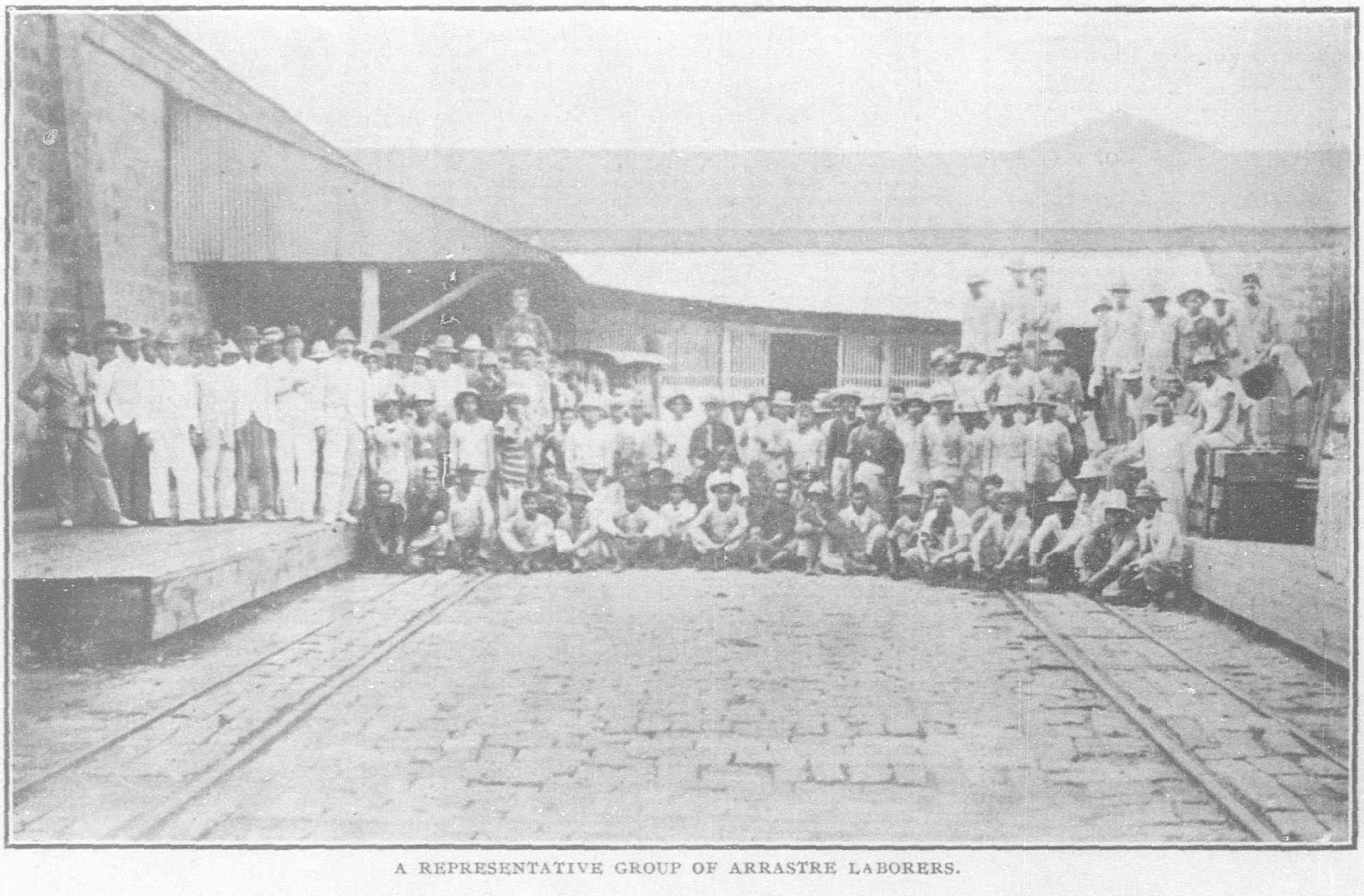
FIRE AND POLICE PROTECTION.—The Arrastre Division maintains and has charge of a system of fire protection of the custom house grounds, consisting of a reel and fire hose and barrels and buckets. It also provides four policemen and watchmen in the warehouses by day, and one on the wharf at night, in addition to the regular custom house watchmen. The division also cleans the customs wharf and grounds once or twice each day.

OFFICE AND PERSONNEL.—The entire finances of the arrastre are conducted by its own office, the collections for the charges being made by its receiving teller and deposited with the Insular Treasurer in separate account. The expenditures are made by its disbursing officer under the usual regulations. A complete system of accounts is kept in its office.

LABOR.—The laborers are all Filipinos—mostly Pampangas, Visayans, and Ilocanos—only a very few Tagalogs. About one-fourth are steady workers. Another fourth or a little more work about three to four days a week. The others come and go, working one to two or three days a week. There has never been any difficulty in obtaining all laborers needed. They do good work if plenitfully superintended, but not otherwise. They are paid 90 centavos, Philippine currency, per day of eight hours, and at the same rate for overtime, and are paid weekly. The average number employed is 125 to 150.

The skilled and semiskilled employees are paid monthly and number 65 to 70. The native assistant superintendents are paid salaries of from ₱42 to ₱50, the locomotive engineers from ₱25 to ₱50, the crane engineers ₱34, firemen ₱20, machinists ₱25 to ₱50, carpenters ₱40 to ₱50, wharf and warehouse foremen ₱30, and openers and packers ₱30.

The whole force of skilled and semiskilled employees and laborers have done good work, being well and liberally superintended.



A REPRESENTATIVE GROUP OF ARRASTRE LABORERS.

FAR EASTERN ENGINEERING AND CONSTRUCTION NEWS

PERSONAL

It is announced that Messrs. Arnhold, Karberg & Co have opened a branch at Newchwang in charge of Mr. Otto Hoppe as manager.

Mr. W. Wilson, manager of the Kowloon Docks, has been appointed acting chief manager during the absence on leave of Mr. W. B. Dixon.

It is reported that Mr. R. H. Brown is to succeed Mr. Morgan Browne as works manager on the staff of Messrs. Howarth Erskine, Ltd., in Bangkok,

Mr. J. E. Boulton has been appointed acting Assistant Director of Public Works at Hongkong during the absence on leave of Mr. P. N. H. Jones.

Mr. B. W. Cadwallader, of The B. W. Cadwallader Company, Manila, and Miss. Grant, daughter of Mr. Louis T. Grant, general manager of the firm of Grant & Co., Ltd., Manila, were married recently in this city.

Mr. J. W. Davidson, late acting American Consul-General at Shanghai, and Consul-General designate to Antung, who has been suffering with typhoid fever, is now convalescent. He has sailed for the United States.

RAILWAYS, SUPPLIES, ETC.

Shanghai-Nanking Line.—Four large locomotives for passenger trains, and two smaller locomotives for construction trains, for the Shanghai-Nanking Railway have arrived at Woosung.

Line to Kalgan, China.—The Chinese Government has commenced the construction of the 120-m. railroad to Kalgan. A contract for a large portion of the rails has been awarded to a French firm.

China Railways and Belgium.—It is reported from Peking that the Chinese Government is borrowing a further sum of £508,000 from Belgium capitalists, for railway extension, and the agreement has been signed.

Railway Surveys, Federated Malay States.—The following railway surveys will be shortly undertaken by the Federated Malay States Government:—Kuala Semantan to Kuala Lipis *via* Bentong, about 100 m ; Kuala Semantan to Kuala Lipis *via* Kuantan; Kuala Semantan to Kuala Lipis, about 70 m.

Kwangchow-Kowloon Line.—The viceroy and Governor of Kwangtung has telegraphed to the Waiwupu protesting against the grant of a concession of the Kwangchow-Kowloon railway to any foreign syndicate. The viceroy says that the Liangkwang provinces must find the money themselves and can not afford to let the line go to foreigners.

Hsinning-Canton Line, China —Representatives of the promoters of this railway have collected over $600 000 in the United States for the enterprise, and this sum, with the money already guaranteed in Canton and Hsinning, comes up to $2,000,000. Permission for the construction of the line has already been granted by the Chinese authorities.

Freight Car Order, Japan —Five hundred gondola freight cars have been ordered by the Japanese Government, through Messrs. Mitsui & Co., from the Middleton Car Works of Middleton, Pa., which makes a total of 2,400 cars known to have been contracted for by Japan within the last 3 months. The cars will be of wood, fitted with the King patent, steel underframe.

Yunnan Railways.—The request of the French consul at Mêng-tsz' for the employment of French engineers on the construction of the Chinese Government railways in Yunnan and Szachuan has been refused by the viceroy of Yunkui. The consul then endeavored to secure from the viceroy a promise that no foreign engineer, irrespective of nationality, should be engaged on the railways, but this request was also refused.

Railway Equipment, Japan.—The large rush orders for locomotives and freight cars placed with American manufacturers by the Japanese Government for the imperial railways have been occasioned, it is said, by the depletion of rolling stock caused by the shipment of large quantities of equipment from Japan for the Manchurian railways. The extremely wide gauge (8 ft.) of the Manchurian lines has been reduced to 3½ ft., which renders useless the rolling stock captured from the Russians.

Tientsin-Chinkiang Railway.—With reference to the agreement for this line, drafted by Great Britain and Germany, the Waiwupu at Peking, in accordance with the petition of the people of Shantung Province, has communicated to the British Minister its desire to cancel the agreement, to which the British Minister replied that that was impossible, while the German Minister, after telegraphing urgently to his government, is doing his best, through the Governor of Tsingtao, to suppress the opposition in Shantung.

Railway Concessions Granted by China.—*Chinchen:* To England and Germany; from Tientsin to Chinkiang; 600 m., capital £7,400,000. *Branch lines:* From Tichu in Shantung, to Chenting in Chihli, and from Chinting in Shantung, to Kaifeng in Honam. *Huning:* To England; from Shanghai to Kiangning, 233 m.; capital £3,000,000.' *Suhangyung:* To England, from Suchau to Hangchou and to Ningpo, 1677 m. *Chinkuang:* To England, from Canton to Kowloon 90 miles. *Puhsin:* To England from Puku in Kiangning, through Anhui to Hsinyand in Honan; 333 miles. *Tsepu:* To England; from Tsechau in Shansi to Puku in Kiangning. *Tienyueh:* To France; from Annam Mentgtzu and Yunnan. The Chinese Government has Tls. 1,000,000 invested in it.*Tienmien:* To England; one from Tengyuen in Yunnan; to Burma, and one from Shunning to Burma.

Railroads in China.—Mr. J. W. Ragsdate, American Consul-General at Tientsin, has submitted to his government what he believes to be a complete schedule of railways constructed and projected for China. It is as follows: Railways Constructed—*Eastern Chinese:* Russian money loaned by France; from Siberia to Yingkau. The Chinese Government has Tls. 5,000,000 invested. *Southern Manchuria:* Russian capital; from Yingkau to Port Arthur and Dalney. *Chingchin:* From Peking to Tientsin, 80 m.; British capital and Tls. 2,000 000 of Chinese capital. *Chinyu:* British capital: from Tientsin to Shanhaikwan; 131 m. *Kwanwai:* British capital; from Shanhaikwan to Hsinmintun; 240 m.; cost Tls. 160,000,000. *Kwanwai Chihli:* Branch lines beyond Shanhaikwan; one from Chinhusu to Hsinmintun; one from Ninho to Nanp'ao coal mines cost Tls 1,500,000 *Chinpao:* Belgian and French capital; from Tientsin to Poatingfu. This is a portion of the Luhan line. *Luhan:* Belgian and French capital: from Lukuchiao to Hankow: 933 m. capital Tls 40,000,000 of which Tls. 13,000,000 is owned by the Chinese Government. *Luhan Branches:* From Linliho to Chukutien in Fangshan district 9 m. ; from Jungtsu to (1) Kaifeng, 57 m. ; to (2) Honanfu 83 m.; from Yencheng to Chuchiation 40 m.; capital Tls. 1,700 000. *Sungha:* Belgian and French (British?) capital; from Shanghai to Wusung; 10 m. Paid from the Luhan money. *Kiaochi:* German capital; from Kiaochau to Chinanfu; 343 m.; capital £15.000,000. *Lungchau:* French capital; from Lungchau in Kwangsi to Annam; 50 m.; capital Tls. 9,000,000. *Chengtai:* Russian with French capital; from Chentingfu, in Chihli, to Taiyuenfu, in Shansi; 167 m.; capital Tls. 6,849,000. *Tuehhan*—United States; from Canton to Hankow; 800 m.; capital Tls. 40,000,000.

Railways in Formosa.—Mr. F. D. Fisher, American Consul at Tamsui, Formosa, in his last report says: —From January 1st, 1905, full forces have been working day and night on the construction of the section of the Formosan Government railway from the Dakusi River to Koroton, 40 m., with the expectation of opening it to traffic by April 1st. This section is a northern extension of the southern division. The principal difficulty that presents itself in this work is the crossing of the Dakusui River. On account of the force of the current during the floods and the continual changing of the channel the engineers have not as yet been able to decide upon a satisfactory plan for the construction across the stream of a permanent steel bridge, which will require a length of about 4,000 ft. However, experimental piers are soon to be constructed, which, if found satisfactory after a fair test, will be adopted in the erection of the bridge. Upon the completion of this section there will still remain a gap of about 9 m., between the northern and southern divisions of the railroad—from Hakukoko, the present southern terminus of the northern division to Koroton, which will then be the northern terminus of the southern division. On account of the extensive tunnel work and bridging to be done in this section, the two divisions will probably not be connected before the end of 1906 Eight tunnels, aggregating a length of 3¼ m., and bridges over the Taian and Taiko rivers and a branch of the latter, of 2,510 ft., 1,760 ft. and 200 ft. in length, respectively, are to be constructed within the 9 m. At present a double tramway line of 19½-in. gauge circuitously connects the two divisions of the railway, Chinese coolies furnishing the motive power. When the two divisions are joined, the main line will extend from Kilung, in the N., through the western portion of the island, to Takow in the S., a distance of abont 250 m., and will afford transportation facilities between the principal ports and the developed sections of the island. Small tramways, from 3½ to 15 m. in length, reach out into the more important of the productive districts along the line. Chinese coolies furnish the motive power on these tramways, and while they are miniature affairs, having a gauge of but 19½-in. and the beds of the cars being but 4 ft. sq., they generally meet the requirements, the chief of which seems to be cheapness of transportation. The railway bureau has well-equipped repair shops at Taihoku, on the northern division, and shops suitable for making ordinary repairs at Takow, on the southern division. The Osaka Car Construction Company has branch shops at Taihoku, from which freight and passenger cars are now turned out.

ELECTRIC LIGHTING, TRACTION, POWER, ETC.

Siamese Tramway Company, Ltd.—The lines of this company will be opened for public traffic Sunday, October 1st. Thirty cars will be put on the run at once. The big car shed is now complete It measures 200 ft. by 20 ft. and at the far end are three pits capable of accommodating 12 cars. The power station contains three 200 kw. direct-current plants by Messrs. Bowett & Lindsay. The switchboard has three generator panels, one total output panel, three feeder panels, and one station-lighting panel. The condensers are by the Wheeler Engineering Company, the overhead traveling crane by Messrs Jessop & Appleby, and there are three Babcock & Wilcox water-tube boilers.

Electric Light Companies, Japan —There are 63 electric light companies in Japan, having aggregate authorized capital of -Y-15,428,250, of which amount -Y-12,517,1 5 is fully paid up besides -Y-1,014, 257 credited to reserve funds. The total length of electric lines is 1,459 m., or about 5,000 m. of wires. Sixty-nine thousand three hundred and twenty-eight houses are supplied with light to the extent of 296, 872 watts, and 8,818 street lamps are operated. The aggregate receipts amount to -Y-4,051,709 against an operating expense of -Y-2,224,145, leaving a net profit of -Y-1,827,564, of which -Y-1,380,101 was distributed in dividends last year, making an average of 11 per cent in profits on the paid up capital.

Celebes-Guam Cable.—The cable steamer *Stephan*, of the North German Cable Works, Nordenham, has completed the laying of the cable between Menado, Yap and Guam, for the German-Holland Telegraph Company, of Cologne. The length of this cable is nearly 2,000 m., and its weight about 4,000 tons, and the greatest depth attained 2,300 ft. By this cable the Ducth-India colonies and the German Carolines are placed in communication with the American Pacific cable. The *Stephan* will next lay a cable 130 m in length from Shanghai along the China Coast, which will form a part of the Shanghai-Yap cable, of which the main line is now being constructed by the North German Cable Works and which, it is expected, will be laid next winter.

Electric-Hydraulic Plant, Japan.—An order has been placed with American manufacturers for an electro-hydraulic plant for the Kanazawa Electric Light Company, Kanazawa, Japan. It will consist of a Westinghouse 120-kw, rotating armature alternator, 2,200 volts, 60-cycles, 3-phase, to be direct coupled to a 22-in., high pressure, horizontal Victor turbine made by the Platt ironworks, Dayton, O. The turbine is to be capable of developing 230 actual h. p at the shaft, under a working head of 190 ft., running at 720 r. p. m. Some of the power of this wheel will be used in operating other apparatus in addition to the 120-kw. generator. To furnish excitation a 2-kw. machine will be driven from the generator shaft. To control the above alternator and exciter, there will be a standard Westinghouse white marble switchboard, equipped with Westinghouse instruments. For governing a Lombard type "Q" 8 x 16 governor has been ordered. It is hoped to lay down the complete plant in Japan by the first part of October.

Development in India —Considerable activity is being shown in India in electrical development. The Indian Electric Supply and Traction Company (Limited), with a capital of £600,000, divided into 120,000 shares of £5 each, has been formed in London, to establish and work electrical enterprises in India. Messrs. Kilburn & Co. and Crompton & Co. (Limited) occupied practically the same respective positions towards the Calcutta Electric Supply Corporation (Limited), as they will occupy toward this company. The first business of the company will be to construct a tramway in Cawnpore and its suburbs, with the necessary generating station to supply electric power for working such tramway, and also to supply current for electric light and the working of fans and for other purposes in Cawnpore. Concessions have been granted by the municipal board of Cawnpore, the district board of Cawnpore and the cantonment committee of Cawnpore, these concessions being authorized by the government of the United Provinces of Agra and Oudh by orders which have been sanctioned by the government of India. The concessions provide for their early transfer to this company.

Electric Tramway Companies, Japan —The first electric tramway built in Japan is the line 8 m. in length, opened in Kyoto in 1895, during the holding of a national industrial exposition in that city. Since then other cities have adopted the system, and at the present there are 17 electric tramway companies in the empire, with an aggregate capital of -Y-36,000,000 or roughly $18,000,000 gold, operating 120 m. of line, and with 85 m. under construction. Most of the companies are, however, still in the initiatory stage, and have yet to show profitable returns. The Tokyo tramways, show an annual profit of not less than 10 per cent, and it is confidently expected the other lines will prove equally remunerative.

From the recent statistics compiled by the Imperial Department of Finance, it appears that the United States leads in supplying eletric motors and cars. During the year of 1904, American manufacturers sold to Japan electrical machinery to the value of -Y-812,226, or about 66 per cent of the total imports and electric cars to the value of -Y-783,699, or about 87 per cent of the total.

Following is a list of the electric tramway companies of Japan, with authoritative date compiled by the Department of Finance:—

Tokyo Street Railway Company.—*Capital*—Authorized, -Y-15,000,000; paid up, -Y-6,000,000; reserve, -Y-23, 364. *Lines*—In operation, 10.46 m ; length of track, 20 61 m.; under construction, 4 45 m.; length of track, 9 10 m. Number of cars, 351; passengers carried, 18,937,907. *Earnings*, -Y-855,002; expenses, -Y-329,353; net earnings, -Y-525,650; dividends, -Y-360,000; rate, 1 per cent.

Tokyo Electric Tramway Company.—*Capital*—Authorized, -Y-6,000,000; paid up, -Y-5,000,000; reserve fund, -Y-289,915 *Lines*—In operation, 12.45 m.; length of track, 21.12 m ; under construction, 0,68 m ; length of track, 0.68 m. Number of cars, 250; passengers carried, 42,350,787. Earnings, -Y-1,464.183; expenses -Y-712.404; net earnings, -Y-751,779; dividends, -Y-512, 188; rate, 11 per cent.

Kawagoye Electric Tramway Company.—*Capital*—Authorized, -Y-250,000; paid up, -Y-87,500. *Lines*—In operation, 8 m. (First year).

Iwamura Elfctric Tramway Company.—*Capital*—Authorized, -Y-110,000; paid up, -Y-66,992. *Lines*—In operation, 7.35 m.; length of track, 7.48 m.

Tokyo Electric Tramway Company.—*Capital*—Authorized -Y-6,000,000; paid up, -Y-3,920,000. *Lines*—Under construction, 24.31 m.; length of track, 42.14 m.

Tamagawa Electric Tramway Company.—*Capital*—Authorized Y-400,000; paid up, -Y-100,000. *Lines*—Under construction, .08 m ; length of track, .40 m.

Compania General de Tabacos de Filipinas, Barcelona and Manila.—This company has declared a dividend of 3 per cent or 15 pesetas per share, on account of profits for 1904.

Osaka Municipal Electric Tramway.—Appropriated expenditure, -Y-139,674. *Lines*—In operation, 3.08 m. Number of cars, 5; passengers carried, 1,529,787. Receipts, -Y-49,148; expenses, -Y-30,113; net earnings, -Y-19,035.

Osaka-Kobe Electric Tramway Company.—(Opened to traffic, May 1905).—*Capital*—Authorized, -Y-1,500,000; paid up, -Y-1,500,000. *Lines*—In operation, 19.01. Paid dividend of ½ of 1 per cent for 1904 from miscellaneous receipts; amount of dividends, -Y-55,978.

Hoshio Electric Tramway Company.—*Capital*—Authorized, -Y-200,000; paid up, -Y-200,000. *Lines*—In operation, 7.08 m. Number of cars, 4; passengers carried, 300,861. Receipts, -Y-39,226; expenses, -Y-32,777; net earnings, -Y-6,449.

Tsuchiya Electric Tramway Company.—*Capital*—Authorized, -Y-100,000; paid up, -Y-85,000. *Lines*—In operation, 1.61 m.; length of track, 2.09 m. Number of cars, 10; passengers carried, 555,098. Receipts, -Y-13,454; expenses, -Y-12,080; less carried over from previous year, -Y-1,082.

Yokohama Electric Tramway Company.—*Capital*—Authorized, -Y-1,00,000; paid up, -Y-550.000. *Lines*—In operation, 1.58 m ; length of track, 2 57 m.; under construction, 0.23 m ; length of track, 3.28 m. Number of cars, 22; passengers carried, 812,130. Receipts, -Y-23,570; expenses, -Y-27,849; less, -Y-4,279.

Astor House Hotel Company, Ltd., Shanghai.—The directors of this company recommend the payment of a 10 per cent dividend out of the profits of 1904, placing $10,500 to a reserve fund, and carrying forward $9,000. Ample amounts have been set aside for depreciation and bad debts.

Odawara Electric Tramway Company.—*Capital*—Authorized, -Y-875,000; paid up, -Y-810,750; reserve, Y-19,299. *Lines*—In operation, 8.05 m.; length of track, 8.79 m. Number of cars, 34; passengers carried 312,943. Earnings, -Y-90,239; expenses, -Y-56,382; net earnings, -Y-33,857; dividends, -Y-31,326; rate, 2 85 per cent.

Enoshima Electric Tramway Company.—Capital—Authorized, -Y-200,000; paid up, -Y-200,000; reserve, -Y-1,282. *Lines*—In operation, 4.67 m.; Length of track, 5.34 m.; under construction, 1.37 m.; length of track, 1.57 m. Number of cars, 10, passengers carried, 182,446. Earnings, -Y-18,356; expenses, -Y-13,998; net earnings, -Y-4,358; dividends, -Y-2,000; rate, 2 per cent.

Ise Electric Tramway Company.—*Capital*—Authorized, -Y-260,000; paid up, -Y-234,000; reserve, -Y-6,100. *Lines*—In operation, 4.74 m.; length of track, 5.35 m.; under construction. 3.38 m.; length of track 6.15 m. Number of cars, 8; passengers carried, 185,651. Earnings, -Y-15,436; expenses, -Y-12,978; net earnings, -Y-2,458; dividends, -Y-8,484; rate, 4 per cent.

Nagoya Electric Tramway Company.—*Capital*—Authorized, -Y-500,000; paid up, -Y-414,712; reserve, -Y-10,595. *Lines*—In operation, 3 38 m.; length of track, 7.76 m.; under construction, 3.66 m ; length of track, 3.66 m. Number or cars, 35; passengers carried, 3,099,227. Earnings, -Y-69,769; expenses, -Y-46.204; net earnings, -Y-23,565; dividends, -Y-21,280;rate, 5.5 per cent

Imperial Chinese Railways.—The net half-yearly profits of the Imperial Chinese Railways for the six months ended March 1st, amount to a little over £325,000, and if the rate of progress is maintained, as is confidently expected, the year's profits will, even after paying interest on the loan and providing the stipulated sum for amortization, amount to over £600,000.

Osaka Shosen Kaisha.—The total receipts of this company from January to June last, inclusive, were -Y-5,371,000 while the business expenditure for the six months reached the figures of -Y-4,190,000, the net profits being -Y-1,181,000. The company has now a fleet of 94 steamers, with a gross tonnage of 90,626 tons, exclusive of a number of foreign steamers under charter.

Tokio-Yokohama Electric Tramway Company.—*Capital*—Authorized. -Y-2,550,000; paid up, -Y-1,275,000; reserve, -Y-9,738. *Lines*—In operation, 10 60 m.; length of track, 17.6 m.; under construction, 6.78 m.; length of track, 13.76 m. Number of cars, 44; passengers carried, 1,490,801. Earnings, -Y-126;261; expenses, -Y-71,328; net earnigs, -Y-54,938, dividends, -Y-54,349; rate, $5.30 per cent.

Kyoto Electric Tramway Company.—*Capital*—Authorized, -Y-1,200,000; paid up, -Y-900,000; reserve, -Y-55,390. *Lines*—In operation, 15.31 m.; length of track, 19.23 m.; under construction, 3.18 m.; length of track, 3.45 m. Number of cars, 38; passengers carried, 3,553,612. Earnings, -Y-148,208; expenses, -Y-111,179; net earnings, -Y-37,030; dividends, -Y-25,200; rate, 2.80 per cent.

PORT WORKS, DREDGING, DOCKS, ETC.

Dredging at Tientsin.—A bucket dredger has commenced to deepen the channel in the Pei Ho at Tientsin just above the International Bridge.

Yokohama Harbor.—The work of dredging this harbor, in the opinion of those acquainted with the conditions, will not make much progress unless the expenditure of -Y-100,000 per year is increased by the government.

Dredging at Canton, China.—The dredger *Canton River* is employed at Canton removing barriers for the Imperial Chinese Maritime Customs, for which work she is still under charter from the Hongkong and Whampoa Dock Company. Further employment at Canton is in prospect.

Dredging Honolulu Harbor.—The bid of the San Francisco Bridge Company of 24.87 cts. per cu. yd., for dredging about 1,500,000 cu. yds., from Honolulu Harbor, has been recommended to the Government at Washington for acceptance.

SHIPBUILDING, MARINE, ETC.

Russian Mines Adrift.—It is reported that there are a large number of Russian mines adrift on the Japan Sea, having floated off the sunken warships.

Stranded Ship Floated.—The French steamer *Bin Thuan*, stranded off Hokkaido, has been floated off by blasting the rocks, and now lies at Otaru for repairs.

Treasure Thrown Overboard.—It is reported that the Russian warship *Orel*, of the Baltic Fleet, threw overboard 1,500,000 roubles before she surrendered to the Japanese.

German Steamer Confiscated.—The German steamer *Vega*, 2,562 tons, has been definitely confiscated at Sasebo, Japan, with her cargo of 3,616 tons of Cardiff coal for Vladivostock.

Russian steamer "Sungari."—The Russian steamer *Sungari*, generally believed to have been hopelessly destroyed at Chemulpo, is now in the Japanese service, renamed *Shoko-maru*.

"Owan-maru" Aground.—The Nippon Yusen Kaisha's steamer *Owan-maru*, 629 tons net, from Mororan to Hakodate, went aground in a fog recently. It is hoped that the hull will be refloated.

Chinese Cruiser, "Kiang Yuan."—This new war ship, built by the Kawasaki Dock Company, Kobe-is fitted with twin screws and seems to be a speedy craft. She is anchored at the Kiangnan Arsenal.

Steamer Charters, Japan.—The British steamers *Victoria* and *Ganges*, and Japanese steamers *Tamon-maru* and *Nanawa-maru* have been chartered to the Nippon Yusen Kaisha for the company's home services.

Battleship "Oregon," U. S. Navy.—It is announced from Washington that the battleship *Oregon*, now stationed in Asiatic waters, is to have a general overhauling at Bremerton. Her complete overhauling will require several months.

Collision in Japan Waters.—The steamer *Konoura-maru* came into collision recently with the *Zencho-maru*, between Tsushima and Iki. The latter steamer was sunk. She was a vessel of 323 tons and owned by Mr. Ikeda of Saga, Japan.

Stranded "Romulus" Sold.—The stranded steamer *Romulus* (German) has been sold to Mr. Ooka Kaso of Hachinohe, where she lies stranded, for -Y-28,065. She is a vessel of 2,640 tons and had 3,500 tons of Cardiff coal for Vladivostock.

Motor Boats, Japan.—The demand in China for motor boats promises to be very bright. The whole of China is a network of rivers and canals upon which this class of craft, especially boats of light-draught capacity, can be operated.

New Kobe-Shanghai Line.—It is announced that Mr. Deshler of Kobe, who has established a maratime service between Kobe and Chinnanpho with the steamer *Ohio*, has decided to open a new line between Kobe and Shanghai *via* Chemulpo, with three steamers.

Kawasaki Shipbuilding Company, Kobe.—This company has at present two steamers under repairs at its dockyards and two *Nippon Yusen Kaisha* and *Orizo Kisen Kaisha* steamers under construction. There are over 6,000 workmen employed at the company's dockyard and engine works.

Yacht Construction, Japan.—A yacht for the use of the crown prince of Siam has just been built at the Kawasaki Dockyard Company's works. She is 132 ft. 6 in. in length, 11 ft. in breadth, and the speed is 10 knots. The internal fittings and furnishings are said to be luxurious.

Steamer for F. M. S. Railways.—Messrs. Riley Hargreaves & Co., Singapore, have secured the contract for the construction of a steel twinscrew passenger and towing steamer for the Federated Malay States Railways to be used between Penang and Prai. The vessel will cost $70,000.

Launch of a Steamer, Japan.—A steel steamer of 1,250 tons was recently launched at the Osaka Iron Works. The vessel has been built to the order of the Osaka Shosen Kaisha and will ply between Japanese ports and Tientsin. She is of shallow draught and will be able to go right up the Pei-ho and lie alongside the wharf at Tientsin.

"Rohilla" and "Rosetta" Sold.—The *Rohilla-maru* and the *Rosetta-maru*, which were purchased by the Toyo Kisen Kaisha from the Peninsular and Oriental Steam Navigation Company, have now been resold to the *Orizo Kisen Kaisha*. The vessels are now in the service of the Japan Red Cross Society. They are intended for the South American service which the *Oriao Kisen Kaisha* has decided to open.

Hongkong-Whampoa Dock Company.—This company has installed an electric drive in the boiler shop and shipyard with satisfactory results. Several more motors will be required for this department before it is complete. Two new electric cranes have been fitted in the machine shop. The new drawing office in Kowloon is practically completed and the entire technical staff of the company is now located there.

New Steamers, C. P. Railway Company.—This company is reported to have arranged to construct three passenger steamers from 14,000 to 15,000 ton-gross each, for its steamship service between Hongs kong and Vancouver. When these vessels are completed and placed in the service, the *Empress of India*, the *Empress of China* and the *Empress of Japan*, it is stated, will be transferred to the Australian service.

Sold to Japan.—The steamers *Gisela* and *Gota* have been sold to the Nippon Yusen Kaisha for the Company's Hokkaido service. They are sister ships of 1,526 tons each. The same company has purchased the steamers *Grafton* and *Mazagon* from British shipowners. These vessels are on their way from London to Kobe. The *Standard* and another Norwegian steamer, under charter to the Osaka Shosen Kaisha, have now been sold to the Japanese Steamship Company. The *Standard* has been renamed the *Fukushu-maru*, and the other, the *Oushu-maru*, by the purchasers, who will place them in their Korean service.

No Bids for Pacific Freight.—The War Department is without bids this year for the transportation of freight from Pacific Coast ports to Manila. Last year the Pacific steamship companies made satisfactorily low rates for carrying government freight to Manila. This afforded some critics of the army transport system an admirable opportunity to make comparisons of the cost, to the detriment, it was alleged, of the army transports, and altogether in favour of the contract system of transportation of freight and passengers. Lately the Pacific liners found it impossible to take a cargo to Manila, and one of the transports held in ordinary was placed on the active list for transportation purposes. With the failure of the steamship company to send a bid to Washington, it is quite evident that they desire to place the government on the same footing as commercial shippers. If this is done, of course, a very attractive comparison which the jugglers of figures have been able to make in favor of the commercial liners will no longer be possible even by exercise of a vivid imagination.—*San Francisco Chronicle.*

Novel Engineering Feat.—An interesting piece of work has just been completed at the Burma Oil Company's depot at Budge-Budge, Burma. This was the shifting of three large kerosene oil tanks from their original positions to new sites 300 yds. away. The tanks, which are each of a capacity of 500,000 gals. of oil, and of the usual cylindrical pattern, measure 30 ft. in height and 58½ ft. in diameter and with ballast weighed about 140 tons each. The first step in the work of removal was to build two parallel "bunds," so as to form a canal along which the tanks were floated by a circuitous route to the new sites. Into this canal 5,000,000 gals. of water were pumped, at the rate of 100,000 gals. per hour by the port commisioners' firefloat *Hetty*, and the pumps of the Burmah Oil and Standard Oil depots. As soon as there was sufficient depth of water in the canal, the tanks, which drew about 22 in., were floated off and separately towed along by coolies. Piles previously placed in position limited the motion and aided in leaving the tanks securely anchored exactly where they were wanted over their new foundations. The water was then let out, and the tanks settled down into their places without a hitch of any kind, the work of actual removal having taken only 2¼ hrs. We believe we are right in saying that this is the first time that large tanks have ever been removed by floating; ballasting with sand loaded to a parabolic curve being the method employed to prevent floor-plates from dishing.

PUBLIC IMPROVEMENTS.

Public Improvements, Singapore.—The administration report of the Singapore municipality for last year has just been made public. Five hundred and fifty thousand dollars have been allotted as follows—Stamford road canal, $25,000; new water mains $60,000; completion of filters 11 and 12, $10,000; purchase of Worthington pumps, $82,000; electric power installation, $150,000 raising dam impounding reservoir, $30,000; new cinerators. $60,000; Mahomedan cemetery, $68,000; Tanjong Katong roads, $40,000; catonment road, $25,000. No provision has been made in this loan for any further sum required for the Kalang Extension waterworks, or for the new bridge over the Singapore River for neither of which works revised estimates have yet been submitted. *Engineer's Department.*—The expenditure of this department in 1904 was $1,683,335, an increase of $635,538 compared with 1903. *Roads and Streets.*—At the end of the year there were 27.48 m. of granite road and 69.04 m. of laterite road within municipal limits. The total quantity of metal spread on roads was 140,640 cub. yds or 1,457 cub. yds. per m., as against 1,051 cub yds per m. in 1903. During the year 31.28 m. of road were remetalled, 10 01 m. with the granite and 21.27 m. with laterite. *Waterworks.*—There are about 62 m. of distributing mains of 3 in diameter and over *Kallang Tunnel* The total length of the tunnel completed up to the end of the year was 474 ft. out of a total of 1,300 ft. Messrs. Howarth Erskine, Ltd., are the present contractors.

MINES AND MINING.

Prospecting Licenses, Burma.—The Burma Government is granting new prospecting licenses over certain blocks of the Yenangyaung oil fields in the Magwe District.

Ruby Yield, Burma.—The Magok mines, the property of the Burma Ruby Mines, Company, are reported to have yielded rubies to the extent of 205,294 carats in 1904.

Burma Gold Dredging Company.—This company, which is the pioneer of the industry in Burma and has an important concession on the Irawaddy River, has established its head office at Myitkyina, Upper Burma.

Geological Surveys, Mysore.—Recent geological surveys in the Shimoga and Mysore Districts of Mysore have resulted in the discovery of valuable deposits of manganese ore and magnesite which the State Geological Department will probably take steps to exploit.

Rich Coal Mine, Peking.—A rich coal mine in the village of Tzuchaiwu, in the Western Hills, Peking, is about to be worked. A Belgium engineer who surveyed the mine estimates the output at 2,000,000 catties a day.

Tin Output, F. M. S.—The tin statistics for the first half of the current year show that the total output of mines in the Federated Malay States during the period, in piculs, was 419,084.53, an increase of 13,896.65 piculs over that of the corresponding period in 1904.

Lead Smelting, Burma.—The Great Eastern Mining Company, Ltd., which has a concession for lead mining in the Northern Shan States of Burma, has also been permitted by the authorities to mine for limestone and ironstone, the latter for employment at a flux for lead smelting.

Mining Industry, Java—Gold mining progresses slowly but steadily in Java. The Redjang Lebong mine is still the most prosperous and a dividend is expected to be declared as a result of the 1904 working. The Ketahoen and Tokok mines are beginning to do well. A concession has been granted to a company for the exploitation of beds of magnetic iron sand lying in the neighborhood of Tjilatjap, south coast of Java.

Kolar Gold Fields, India.—Following are the returns for the month of July, 1905:—

Balaghat.—4,100 tons of quartz crushed yielded 3,278 oz., and 2,750 tons of tailings cyanided yielded 269 oz., making a total of 3,547 oz. of gold as compared with 3,426 oz., in June. *Champion Reef.*—Milled 19,320 tons which produced 15,877 oz., and 16,374 tons of tailings treated by the cyanide process produced 2,135 oz, making a total of 18,012 oz. of gold, as compared with 18,410 oz., in June.—*Mysore West.*—Mill ran 714 hrs., crushed 2,162 tons and yielded 1,032 oz of bar gold. *Nandydroog.*—6,300 tons of quartz crushed yielded 5,091 oz. and 7.020 tons of tailings cyanided produced 663 oz, making a total of 5,754 oz. of gold as compared with 6,154 oz., in June. *Ooregum*—Stuff crushed 10,300 tons, gold produced 4,444 oz. and slimes and tailings cyanided 10,061 tons. Yielded 1,043 oz. making a total production of 5,487 oz, as compared with 5,485 oz., in June. The net imports of gold into India during the month of June were 69.642 oz. and that of silver for the same period 6,057,066 oz. *Hutti*—(Nizam's). 1,106 oz. of gold from 2,025 tons of quartz crushed. *Mysore.*—16,600 tons of quartz crushed produced 15,420 oz., and 13,650 tons of tailings cyanided yielded 1,834 oz., making a total of 17,254 oz. of gold as against 17,051 oz., in June.

New Mining Laws, Japan.—The old mining regulations of 1890 for Japan were superseded last (July) month by a new mining law. The Minister of Agriculture is empowered by this law to permit, cancel or suspend the right of mining, permanent or trial. For purposes of administration of the mining industry, the whole country is divided into five districts, each under a mine inspection office. The area of a mining set must be, for colliers not less than 50,000 *tsubo* (about 41 acres), and for other mines not less than 5000 *tsubo* (about 4 acres), nor exceed for mines of all kinds 600.000 *tsubo* (about 490 acres). Japanese subjects and juridical persons constituted conformably to the laws of the empire may acquire mining rights. Mining rights are classed as real rights to which the provisions relative to immovable property are correspondingly applicable, and they are indivisible. They can not be made subjects of rights other than those of succession, transfer, measures taken in consequence of non-payment of national taxes, and execution; but the right of permanent mining may become the object of a mortgage. The duration of a right of trial mining is two years from the date of the registration thereof. A mining mortgage law, which enables holders of mining rights to create mining foundations with a view to the mortgage thereof, operates in connection with the new mining law. A mining foundation is formed with the following, which belong in connection with mining to the owner of a mining right:—(1) Mining right; (2) land and works; (3) superficies and right of use of land; (4) right of hiring things, to which the letter thereof has given his consent; (5) machines, instruments, vehicles, vessels, oxen, horses and other appurtenances.

FINANCIAL NEWS.

Japan Breweries Amalgamation.—The amalgamation of the three beer brewing companies of Japan, Yebisu, Asahi, and Sapporo, is to be followed by an increase of capital to -Y-5,000,000.

Philippine and Manila Bonds.—The Secretary of the Treasury at Washington announces that, beginning on August 1st last, Philippine and Manila Bonds, amounting to $13,500,000, will be accepted by the treasury for existing government deposits instead of United States bonds, provided that United States bonds are released immediately and used as a basis for additional bank note circulation.

Engineering Amalgamation, Singapore.—At an extraordinary general meeting of shareholders of Messrs. Riley, Hargreaves & Co., Ltd., of Singapore, held recently, it was the unanimous decision of those present that the undertaking of the company should be amalgamated with that of Messrs. Howarth Erskine Ltd., and that a new company should be formed for the purpose of acquiring the property and liabilities of Messrs Riley, Hargreaves & Co. and Messrs Howarth Erskine Ltd.

North Borneo Trading Company.—This concern's report for the year 1904 shows that there was a credit balance on the year's working of £247. This, together with the balance from the previous year of £2,476, makes a credit total of £2,723 which is carried forward. Nothing is reserved for depreciation of plant; but £400 have been written off the launches account for the loss of the steamer *Segaliud*, sunk in the great gale of November, last, and on account of the *Eleanor*, broken up.

Hongkong Cotton Spinning, Weaving and Dyeing Company, Ltd.—Messrs. Jardine, Matheson & Co., general managers of this company, made their report to shareholders at the eighth ordinary meeting the fore part of the current month. The balance at credit of profit and loss account is $178,264.82, which has been appropriated as follows:—To pay a dividend of 10 per cent for the year, $125,000; placed to equalization of dividend fund, $30,000; carried forward to credit of current year's account, $23,264.22.

Wireless Telegraphy, U. S. Navy.—The Navy Department at Washington is arranging to carry out a plan for establishing wireless telegraph communication from the Philippines to San Francisco. The power of stations will be increased so as to maintain unbroken ranges of communication from Cavite to Guam, thence to Midway and Hawaii, and between those islands and San Francisco. This last stretch is more than 2,000 miles, but it is believed that, if the physical obstacle in the Hawaiian Islands can be overcome, there will be no difficulty in establishing communication.

Kawasaki Dockyard Company.—The profits of this Japanese company for the half-year just ended have been declared at -Y 287,696, showing an increase of -Y-97,651 over the profits for the corresponding period last year. A dividend is declared at the rate of 12.5 per cent per annum, absorbing -Y-161,200, and -Y-5,000 is distributed among the employés as a bonus, -Y-28,000 have been placed to the general reserve, -Y-31,200 to the special reserve, -Y-20,000 to the reserve for despreciation and the balance of -Y-41,496 is brought forward to next account.

Hongkong-Whampoa Dock Company, Ltd.—The report of the board of directors of this company to the shareholders, at the ordinary half-yearly meeting, just held, shows that the net profits for the period, after paying interest due and all charges, amounted to $328,200.51, to which has been added the balance brought forward from last account, amounting to $498,289.10. Ten thousand, seven hundred and fifty dollars were deducted for directors' and auditors' fees, leaving available for appropriation $815,739.61. A dividend for the half-year of 12 per cent or $300,000 will be paid to shareholders, and $14,407.34 written from the value of the Kowloon docks, leaving a balance of $501,332.27 to the new account.

Refrigerating Engineers, America.—The Far Eastern Review received recently a copy of the first year book of the American Society of Refrigerating Engineers, which contains much of interest relative to the organization. Anyone can receive a copy by addressing the secretary at the office of the organization, Suite 806, No. 258 Broadway, New York City. The object of the society is to promote the arts and sciences connected with refrigerating engineering. The principal officers are Mr. John E. Starr; New York City, president; Mr. H. B. Roelker, New York City, and Mr. P. D. C. Ball, St Louis, vice-presidents; Mr. Walter C. Reid, New York City, treasurer, and Mr. William H. Ross, New York City, secretary.

Manila Railway Company, Ltd.—For the period to December 31st, 1904, the traffic receipts amounted to -P-1.475,969, and the expenditure in Manila to -P-660,734, leaving a balance of -P-815,245, which at 2s. exchange amounts to £81,524, and deducting the charges in London, etc, the net revenue amounts to £77,708. Interest has been paid on the first mortgage registered stock and on prior lien bonds, A and B., absorbing £42.000. The revenue being in Philippine currency, the comparison with the previous year's figures, athough showing a decrease in pesos, gives a small increase after conversion into sterling. The claims of the company against the governments of the United States and the Philippine Islands have not yet been admitted, and are now in charge of the British ambassador in Washington. The company's claims on the Spanish Government are still pending, but for a considerable proportion an early settlement is promised. The company's system at the end of 1904 consisted of 170 m. open to traffic, and 43½ m. under construction.

Foreign Capital in Japan.—Laws have been passed by the diet which has just risen which show a real desire on the part of Japan to offer reasonable inducement to the foreign capitalist. Hitherto the holders of so-called debentures in this country have had no rights beyond those of any ordinary outside creditor of the company, and their security has therefore been no better than that of preference shareholders in other countries. Under the various mortgage laws just passed holders of debentures issued in accordance with their provisions will have a prior lien on the property, land and plant, against which the debentures are issued, and by another new measure, known as "the law of trust for secured debentures," they will be able, in the event of default either of interest or principal, to exercise their rights of foreclosure through a "trust" company corresponding in large measure to the trustees for the debenture holders in British practice. Any company, limiting its operations to banking and trust business may undertake this function provided it is domiciled in Japan with a capital of -Y-1,000,000 (£102,000), of which half must be paid up. The total sums which may be borrowed under the proposed laws are fixed at the equivalent of the paid up share capital less the amount of loans already obtained.—British Consular Report.

Insurance Companies in Japan.—According to the *Financial and Economical Annual of Japan*, 1905, insurance companies on the European system were first organized in that country about 1881, but for some years subsequent thereto there were no regulations for the supervision of these companies. The Commercial Code, which was promulgated in March, 1890, contained detailed provisions for the conduct of insurance business, but as that code had to be revised before it could be brought into operation, the provisions in question never came into force in their original form. In March, 1899, the present Commercial Code was put in operation. Among other things it laid down the law respecting insurance contracts, and was followed in the ensuing year by the Insurance Business Law, which provides for the control and supervision of insurance companies. Insurance business, under this law, may be carried on either by a joint stock company or on the mutual plan. In either case special permission is needed for business. The capital of a joint stock company and the fund of a mutual company must be not less than -Y-100,000, and a company of neither description is permitted to engage at the same time in any other business in addition to that of insurance. Special regulations were issued by imperial ordinance in 1900 for the supervision of foreign insurance companies so far as concerned their business in Japan.

MISCELLANEOUS NOTES.

Stoves and Heaters, China.—There is a great demand for stoves and heaters of American make in many portions of China.

Acetylene Lighting System, Chefoo.—An illuminating plant embodying improvements in acetylene generation has been installed with great success in Chefoo, North China.

Ice-Making Plant for Baguio Army Post.—The War Department at Washington has purchased a 1¼ ton ice-making plant from the Vulcan Iron Works, San Francisco, for the army post at Baguio, Benguet, P. I.

Formosa Sugar.—The shipment of sugar from Formosa between November and June last, amounted to 635,650 piculs—315,280 piculs from Anping, and 320,370 piculs from Takao—valued at -Y-5,240,000. The stock now remaining in the island is estimated to be no more than 40,000 piculs.

Ice Plant for Japanese.—The Vilter Manufacturing Company of Milwaukee, Wis., has secured a contract for a complete ice-making plant, to be installed in the principal ice factory at Tokyo. The plant will have a capacity of 50 tons per day of clear ice. The ammonia compression system will be used.

Osaka Automobile Company.—This corporation, which has a capital stock of -Y-150,000, has opened a motor car service, with 6 cars each having a seating capacity for 10 passengers, between the N. end of the Nippon Bridge, in the City of Osaka, and Sakai and Ohama, with stations at Imamiya, Tobita, and Tenkachaya. A 20-min. service has been established.

American Lumber Export to the Orient.—"With the cessation of hostilities in Manchuria," says President Wheelwright, of the Pacific Export Lumber Company, "the condition of the lumber market in all Oriental countries drawing their supplies from the Pacific Coast is bound to improve, for the reason that the enormous sum of money now expended in war armament will be released and allowed to flow into the channels of commerce."

Westinghouse Orders, Japan.—The New York office of Messrs. Takata & Co., Japan, has received contracts for vertical, single-acting, simple and compound engines, from the Akabane, Kure, Tokio and Yokoska arsenals, the Kiushiu and Nippon railways, the Fukagawa and Tokyo electric light companies, the Furukawa Western Bureau, the Tokyo Imperial University, the Yokohama Electric Wire Works and the Tokyo Waterworks, aggregating in all about 8,000 h. p. All this apparatus will be of Westinghouse construction.

FAR EASTERN STOCKS AND QUOTATIONS

COURTESY OF BENJAMIN, KELLY & POTTS, SHAREBROKERS, HONGKONG, September, 1905.

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Banks.												
Hongkong and Shanghai Banking Corporation........	1865	$10,000,000	80,000	$125	$125	g £1,000,000 s $8,500,000 i $250,000	... $1,702,728	30-6-05	£1.15/. at exchange 1/10½= $18.66.67 for first half-year 1905	21-8-05	5%	$885 ex div. (sellers London £88½
National Bank of China, Limited.........	1891	£699,475	99,925	£7	£5	$200,000	.........$41,768	31-12-04	$2 (London 3/6) for 1903	1-2-04	—	$38 buyers
Marine Insurances.												
Canton Insurance Office, Limited.......	1881	$2,500,000	10,000	$250	$50	$1,400,000 j $81,739	...... $150,494	31-12-03	$17 for 1903	22-10-04	5%	$335 sales
China Traders' Insurance Co., Ld.	1865	$2,000,000	24,000	$83.33	$25	$950,000 f $151,992 j $362,366 u $371,445	.... Nil.	30-4-04	$4½ for year ended 30-4-1904.........	8-12-04	53%	$80 buyers
North China Insurance Co., Ld...........	1863	£150,000	10,000	£15	£5	Tls. 800,000	...... T217,119	30-6-04	Interim of 7/6 for 1905	1-5-05	8%	T82
Union Insurance Society of Canton, Limited....................................	1867	$2,500,000	10,000	$250	$100	s $1,850,000 g £20,000 f $372,749 j $893,110 u $846,773	.....$2,078,997	30-6-04	$35 for 1903	21-10-04	4¾%	$750 buyers
Yangtsze Insurance Association, Ld. ...	1862	$800,000	8,000	$100	$60	$750,000 j $50,000 f $5,890	...... $599,364	31-12-04	$12 and $3 special dividend for 1903	12-4-05	8½%	$172½
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $218,039 f $2,241	...... $260,374	31-12-04	$6 dividend and $1 bonus for 1903...	10-3-05	8¼%	$84 sales
Hongkong Fire Insurance Co., Ld.......	1868	$2,000,000	8,000	$250	$50	$1,200,505	...... $360,372	31-12-04	$34 for 1903	7-3-05	10½%	$335 sales
Shipping.												
China and Manila Steamship Co., Ld. ..	1882	$750,000	(1) 30,000	$25	$25	$5,000	$8,832	31-12-04	$1 for 1904	27-3-05	5%	$20 sellers
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$185,000 i $85,439	.... Nil.	30-6-04	$2 for year ended 30-6-1904	29-9-04	5¾%	$35
Hongkong, Canton and Macao Steamboat Company, Ld....................	1865	$1,200,000	80,000	$15	$15	e $250,000 d $600,000 f $145,376	.... $8,064	30-6-05	$1 for first half-year 1905..............	16-8-05	7¾%	$26 buyers
Indo-China Steam Navigation Company, Ld................................	1882	£1,200,000	(2) 60,000	£10	£10	£120,000 i £241,150 h £3,999	.... £4,435	31-12-04	12/. @ 1/10 7-8=$6.29.51 for 1904 ...	13-7-05	6½%	$96
Shanghai Tug and Lighter Co., Ld.. .. Do. Preference..	1903	T1,500,000	200,000 100,000	T50	Tls. 50	i T25,000	.... T43,762	31-12-04	Final of Tls 2½ making Tls. 4½ Tls. 1½ making Tls. 3½ for '04	1-3-05	7½% 7%	T60 buyers T50 buyers
"Shell" Transport & Trading Co., Ld..	1898	£2,000,000	2,000,000	£1	£1	£400,000 i £4,116	...... £58,852	31-12-03	Interim of 1/- (Coupon No. 5) for '04	1-1-05	4¾%	21/- sellers
"Star" Ferry Co., Ld	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 i $24,257	.... $929	30-4-05	$1.80 $0.90 cents for year ended 30-4-05	29-5-05	5½% 3¾%	$33 $25
Straits Steamship Co., Ld.	1890	$500,000	(3) 5,000	$100	$100	$400,000 e $21,075 i $130,153	.... . $21,231	31-12-04	$10 for 1904......	21-3-05	6¾%	$150
Taku Tug and Lighter Co., Ld.	—	T. T1,500,000	30,000	T. T50	T. T50	Tls. 98,000 d Tls. 195,479 e Tls. 28,000 i Tls. 81,200	.... T4,333	31-12-04	Interim of Tls. 2 for 1905............	27-7-05	13¾%	T29 buyers
Refineries												
China Sugar Refining Company, Ld....	1878	$2,000,000	20,000	$100	$100	e $450,000	.... $42,812	31-12-04	Interim of $10 for 1905	18-8-05	11%	$229
Luzon Sugar Refining Company, Ld....	1882	$700,000	7,000	$100	$100	none	$85,987	31-12-04	$3 for 1897	24-3-98	—	$25 sellers
Perak Sugar Cultivation Co., Ld..........	—	T350,000	7,000	Tls. 50	Tls. 50	T100,000	.... T1,635	30-9-04	T2½ for year ending 30-9-1904	17-12-04	3¾%	T68 buyers
Mining.												
Chinese Engineering & Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	q £40,000	.... £7,820	29-2-04	Interim of 1/- (No. 4)............	...-7-05	—	T7.70 sellers
Oriental Consolidated Mining Co., Ld.	1901	G.$5,000,000	y 500,000	G. $10	G. $10	none	G. $672,093	31-12-04	Interim of 50cts. (gold) for '95 (No. 5)	11-7-05	—	G. $18
Raub Australian Gold Mining Co., Ld..	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	.... £8,745	31-3-05	No. 12 of 1/-=48 cents......	28-1-01	—	$3½ buyers

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Docks, Wharves and Godowns.												
Farnham, (S. C.,) Boyd & Co., Ld......	1901	T5,520,000	55,200	T100	T100	T1,000,000	........T34,924	30-4-05	Final of T8 making T13 for 1904/05	24-6-05	9¼%	T137 buyers
Fenwick (Geo.,) & Company, Ld.....	1889 1905	$450,000	6,000 z 12,000	$25	$25	$70,000	.... $8,577	31-12-04	$3¾ for 1904.. on 6,000 shares... First year..............................	13-3-05 —	7½% —	$27 buyers $25 buyers
Hongkong and Kowloon Wharf and Godown Co., Ld......................	1886	$2,000,000	40,000	$50	$50	$250 000 q $58,423 i $10,000 p $300,000	........$29,422	31-12-04	Interim of $2½ for 1905..............	26-7-05	5 %	$100
Hongkong& Whampoa Dock Co., Ld.	1901	$2,500,000	50,000	$50	$50	i $41,500	.......$501,332	30 6-05	$6 for first half year '05	22-8-05	6¾%	$191 ex div.
New Amoy Dock Co., Ld....................	1892	$40,500	6,000	$6¾	$6¾	$55,500	............$489	31-12-03	$1¼ for '03....................................	5-5-04	7 %	$17 sellers
Shanghai and Hongkew Wharf Co. Lt.	1902	T3,200,000	32,000	T100	T100	b T487,210 r T59,880	........T10,711	31-12-04	Interim of T6 for 1905..................	23-8-05	6¼%	T191 ex div.
Tanjong Pagar Dock Co., Ld.............	1864	$3,700,000	37,000	$100	$100	$2,100,000	.......$206,745	31-12-04	$20 for second ½ year making $26 for '04..........................	20-3-05	6¾%	$390
Yangtsze Wharf and Godown Co., Ld..	1902	T250,000	2,500	T100	T100	T17,500	.........T2,762	31-12-05	T18 for '04..	29-3-05	9¼%	T195 buyers
Lands, Hotels and Buildings.												
Astor House Hotel Co., Ld. (Shanghai)	1901	$750,000	(4) 30,000	$25	$25	$14,156	..........$9,028	30-6-05	$2½ for year ending 30-6-05	19-8-04	9¼%	$27½ ex div.
Astor House Hotel, Ld. (Tientsin)	—	T. T100,000	2,000	T. T50	T. T50	T34,000 e T8,000	.... T806	29-2-05	Final of T5 making T9 for the year.	20-4-05	6¾%	T135 sales
Central Stores, Ld.........................	—	$91,845	6,000	$15	$12	$20,000	.........$1,502	31-12-04	Final of 60 cents making $1.80 for 04..	30-3-05	10 %	$18 sales
Do. (Founders')...........			123	$15	$12				None.........	—	—	$100
Do. (NewIssue)..............	1904	$360,000	24,000	$15	$7½				Preferential of 7% for '04............	30-3-05	7 %	$7½
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	$100,000 r $10,000	..........$3,554	31-12-04	$5 for 2nd half-year making $10 for '04..................................	30-3-05	7 %	$150
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	e $250,000	........$37,875	31-12-04	Interim $3½ for 1905.....................	27-7-05	5½%	$128
Hotel des Colonies Co., Ld. (Shanghai)	1902	T225,000	9,000	T25	T25	n T20,986	.... T7,202	31-3-05	T2½ for the year ending 31-3-05.....	18-5-05	14 %	T18 buyers
Hotel Metropole Company, Limited	1904	$200,000	2,000	$100	$100	—	.......First	year	Interim of $4....................................	26-1-05	...	$105
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	i $200,994 e $50,000	........$11,958	31-12-04	90 cents for '04..............................	11-2-05	7¼%	$12¼ sales
Kowloon Land and Building Co., Ld. ..	1889	$300,000	6,000	$50	$30	none	.... $377	31-12-04	$3 for '04..	31-1-05	7½%	$40 sellers
Shanghai Land Investment Co., Ld......	1901	T2,600,000	52,000	T50	T50	T828,813 e T170,000	........T40,066	31-12-04	Interim of T3 for '05.................	21-7-05	6¾%	T122 sellers
Tientsin Hotel des Colonies, Ld.	1903	T70,000	1,400	T50	T50	none	.... T670	31-12-04	Interim of T3 for '05.............. ...	4-7-05	12 %	T45 sales
Tientsin Land Investment Co., Ld.......	1902	T772,600	7,726	T100	T100	i T67,300	.... T725	31-12-04	Interim of T3 for '05.................	2-8-05	6 %	T117½ buyers
Wei-hai-wei Land and Building Co., Ld.	1899	T91,850	3,764	T25	T25	none	T687	31-12-04	None	—	—	T12 buyers
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	..........$1,247	31-12-04	Interim of $1¾ for '05..................	27-7-05	6¾%	$56 sellers
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T750,000	15,000	T50	T50	none	........T12,844	31-10-04	T4 for year ended 31-10-03............	22-12-03	8 %	T50 sales
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld..................	1901	$1,250,000	125,000	$10	$10	none	.........$22,862	31-7-04	50 cents for year ended 31-7-04	12-9-04	3¼%	$16
International Cotton Manufacturing Co., Ld.	1895	T750,000	(5) 10,000	T75	T75	T50,000	........T13,629	30-9-04	Interim of 3% a/c 1898.................	30-4-98	—	T45 sales
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(6) 8,000	T100	T100	none	........T10,000	31-12-04	Interim of 4% a/c 1898 on 6,000 shares	1-8-98	—	T57½ buyers
Soy Chee Cotton Spinning Co., Ld.	1895	T1,000,000	2,000	T500	T500	l T5,658	........T22,051	31-12-04	4% for 1897..	2-2-98	—	T225 buyers
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1905	$100,000	4,000	$100	$100	—	—	—	First year..	—	—	$118
Bell's Asbestos Eastern Agency, Ld......	1895	£5,377.10s	8,604	12/6	12/6	£314	............£770	31-12-04	1/3 per share for '04......................	21-7-05	9¼%	$7 buyers
Campbell, Moore & Co., Ld...............	1886	$12,000	1,200	$10	$10	$8,000	.... $1,182	31-12-04	$3 for 1904	1-4-05	8¼%	$36
China-Borneo Co., Ld......................	1903	$720,000	(7) 60,000	$12	$12	none	—	31-12-04	$1 for 1904	17-3-05	8½%	$11¾
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T30,000	............T718	31-12-04	Interim of T5 for 1904	24-7-05	8½%	T77½
China Light and Power Co., Ld.	1901	$500,000	50,000	$10	$10	none	..........$3,739	29-2-04	None	—	—	$10
China Provident Loan and Mortgage Co., Ld.	1898	a $1,000,000	100,000	$10	$10	$80,000	...........$1,5 81	31-12-04	80 cents for 1904................	18-1-05	8¾%	$9.10 sales
Dairy Farm Company, Ld..................	1896	$187,500	25,000	$7½	$6	—	—	31-7-04	$1¼ for year ending 31-7-03..........	20-11-03	—	$17 sales

STOCKS	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Miscellaneous.—Continued												
Green Island Cement Co., Ld.	1889	$1,500,000	150,000	$10	$10	*p* $400,000 $500,000	$95,054	31-12-04	$2 for 1904	27-2-05	7 %	$28
Hall & Holtz, Ld.	—	$420,000	(*8*) 21,000	$20	$20	$186,000	$7,551	29-2-05	Final of $1½ making $2½	15-4-05	9¼ %	$27 buyers
Hongkong and China Gas Co., Ld.	1864	£70,000	7,000	£10	£10	*f* £25,394 £3,000	£8,188	31-12-04	Final of 6% & bonus of 1% making 22s. for 1904	25-5-05	7 %	$175 buyers
Hongkong Electric Co., Ld.	1889 1899	$600,000	30,000 30,000	$10 $10	$10 $5	none	$2,151	30-4-05	$1.00 50 cents for year ending 30-4-05	17-7-05	6¾% 5¼%	$15 $9½
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$50,000	$2,796	30-11-04	$15 for year ending 30-11-04	24-12-04	7 %	$215 buyers
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	*k* $60,000	$5,356	31-12-04	Interim of $4 for 1905	2-8-05	7 %	$237½ sellers
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	10,000	$50	$50	$60,000	$11,137	31-12-04	$10 for 1904	10-4-05	7 %	$152 buyers
Hongkong Steam Waterboat Co., Ld.	1900	$150,000	15,000	$10	$10	$2,500	$299	30-9-04	Interim of 50 cents for half year ended 31-3-1905	3-6-05	13¼ %	$15
Lane, Crawford & Co., Ld. (Shanghai).	1903	$250,000	2,500	$100	$100	none	$21,582	29-2-04	Interim of $5	19-11-04	7¼ %	$145 sales
Maatschappij tot Mijn-, Bosch- en Landbouwexploitatie in Langkat	1902	G.2,500,000	25,000	G.100	G.100	T528,210 T19,465	T35,849	31-10-04	2nd quarterly dividend of T5 making so far T12½ for '05	15-6-05	—	T175 sales
Mondon, (E. C.) Ld.	1902	T350,000	7,000	T50	T50	none	*Dr.* T117,638	31-12-04	T5 for 1902	2-5-03	—	T25
Philippine Company, Ld.	1904	$675,000	67,500	$10	$10	—	—	—	First year	—	—	$9½ nominal
Shanghai and Hongkong Dyeing and Cleaning Co., Ld.	1903	$60,000	1,200	$50	$50	none	*Dr.* $5,537	31-8-04	None	—	—	$50
Shanghai Gas Co., Ld.	1903	T800,000	16,000	T50	T50	*q* T145,000 T108,172	T8,011	31-12-04	Interim of T3½ for 1905	26-7-05	7 %	T122½ buyers
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T10,247	31-12-03	T5 for 1903	8-4-04	6 %	T80 sales
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	T25,000	T6,968	31-12-04	Interim of T6 for 1905	22-7-05	8¾ %	T155 sales
Sanghai Sumatra Tobacco Co., Ld.	1902	T600,000	(*9*) 30,000	T20	T20	T24,820 T25,000	T1,297	31-10-04	Final of T6 making T9	8-3-05	13½ %	T68 sales
Shanghai Waterworks Co., Ld.	1881	£144,000	7,200	£20	£20	T170,000	T17,220	31-12-04	Interim of 15/. for 1905	27-7-05	4½ %	T42c buyers
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	none	*Dr.* $5,068	29-2-05	None	—	—	$20
Steam Laundry Co., Ld.	1902	$75,000	15,000	$5	$5	none	$3,644	31-5-04	60 cents for year ended 31-5-04	2-8-04	7¾ %	$8
Straits Ice Company, Ld.	1884	$200,000	2,000	$100	$100	$25,000	$700	31-12-04	$5 account 1905	...-2-05	—	$150
Tientsin Waterworks Co., Ld.	1901	T. T200,000	2,000	T. T100	T100	*e* T15,259 T4,000	T1,012	30-4-05	Final of T4½ making T8½ for '04/5.	17-6-05	7 %	T. T120
United Asbestos Oriental Agency, Ld. Do. do. (Founders')	1896	$100,000	9,900 100	$10 $10	$4 $10	$22,000	$551	31-5-05	80 cents $19.80 for year ended 31-5-'05	29-7-05	9 % 11 %	$9 buyers $180 buyers
Watson (A. S.) & Co., Ld.	1886	$900,000	90,000	$10	$10	$300,000 $25,000	$6,096	31-12-04	Final of 50 cents making $1 for '04.	29-5-05	7½ %	$14 buyers
William Powell, Ld.	1901 1905	$120,000 $30,000	12,000 3,000	$10	$10	*e* $3,000	$588	30-6-04	Interim of 50 cents for year '04/5 First year	10-4-05 —	10½ % —	$11½ buyers $10½ sales

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUT-STAND'G BONDS	WHEN PAYABLE.	CLOSING QUOTATIONS	
China Government, 7 per cent. Silver Loan 1886 E.	Hongkong & Shanghai Bkg. Cor.	T767,200	T250	1969	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917.	par.	Plus accrued interest
Hongkong Hotel Co., Ltd., 6% Mortgage Debentures of 1899‡		$500,000	$500	§ all	Half yearly, June 30th and December 31st	par.	
Shanghai & Hongkew Wharf Company Ltd. 6% Debentures of 1902		T543,900	T100	....	Half yearly, June 30th and December 31st	T97	
Astor House Hotel Co. Ltd. 8% Debentures of 1903		T500,000	T100	....	Half yearly, January 1st and July 1st	T105	
Chinese Engineering & Mining Co., Ltd., 6% Debentures of 1903†	....	£500,000	¶	£480,000	Half yearly, June 30th and December 31st	par.	
International Cotton Manufacturing Co. Ltd. 6% Debentures of 1901	Russo Chin. B.	T500,000	T100	....	Half yearly, March 31st and September 30th	par.	

a Authorized capital $2,000,000
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation and Insurance Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
k Contingencies Account

l Legal Reserve Fund.
m
n Sinking Fund.
o
p Premium on New Issue.
q Depreciation and Repair Fund.
r Repairs and Renewals Account.
s Silver Reserve Fund.
t
u Underwriting Suspense Account.
v Special Works Fund.

w
x Extra Reserve Fund.
y 75,000 owned by the Company.
z 6,000 shares unissued.
1 5,725 shares unissued.
2 First issue of 60,000 of which 10,411 unallotted.
3 785 shares unissued.
4 7,600 shares unissued.
5 1,616 shares unallotted.
6 842 shares unallotted.
7 14,000 shares unissued

8 399 shares unissued.
9 Only 13,000 shares issued.
* Based on last year's dividend.

§ 270 held by the Company.
¶ In certificates of £20 and £100
‡ Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.
† Redeemable at par at rate of £10,000 per annu from 31st December, 1903 to 31st December, 195
Dr. Deficit.

SINGAPORE SHARE QUOTATIONS.

COURTESY MESSRS. FRASER & CO. BROKERS, SINGAPORE, SEPTEMBER, 1905.

NAME	DATE OF FORMATION	CAPITAL	CAPITAL PAID UP	NO. OF SHARES	ISSUE VALUE	PAID UP	RESERVE	LAST DIVIDEND	SINCE LAST MAIL		CLOSING QUOTATIONS
									HIGHEST	LOWEST	
Mining.									$	$	$
Bersawah Gold Mining Co., Ld.	1900	$175,000	115,000	13,500[1]	10	7.50	....	....	....	....	14.00 sellers
" " " " *Deferred*				4,000	10	10	....	....	....	....	8.00 sellers
Bruseh Hydraulic Tin Mining Co., Ld.	1901	$600,000	600,000	60,000	10	10	....	....	5.75	5.50	5.75 buyers
Kadana Gold Mining Co., Ld.	1901	$300,000	300,000	20,000	10	10	....	....	....	....	10.00 nominal
" " " " *Pref.*				10,000	10	10	....	....	....	....	10.00 "
Kechau Goldfields, Ld. *Fully paid*	1902	£30,000	16,175.7/-	6,207	1	1	....	....	....	....	8.00 sellers
" " " *Contrib.*				23,793[2]	1	19/-	....	....	....	....	7.50 sellers
Pahang Corporation Ld.	1889	£250,000	244,306	244,306	1	1	20,000	3 per cent for year ending 30-6-02	....	....	3.50 sellers
Pahang Kabang Ld.	1890	£375,000	375,000	360,000	1	1	....	....	0.70	0.60	0.70 buyers
" " " *Pref.*				15,000	1	1	....	....	....	....	...... nom.
Queensland Raub G. M. Co., Ld. *Fully paid*	1901	£146,700	100,866	36,700	1	1	....	....	....	....	...... nom.
" " " " *Contrib.*				110,000	1	11/8	....	....	....	....	0.30 sellers
Raub Aust. Gold Ming. Co., Ld. *Fully paid*	1892	£200,000	191,250	50,000	1	1	4,873	1s. paid January, '01	....	....	5.00 nom.
" " " " *Contrib.*				150,000	1	18/10	....	1s. " " "	....	....	4.75 sellers
Redjang Lebong Mining Co.	1898	f.2,000,000	1,800,000	20,000[3]	100	100	....	22 9-10% for year ending 31-12-04	....	....	300.00 sellers
Royal Johore Tin Mining Co., Ld.	1900	$220,000	220,000	22,000	10	10	....	5 " for year ending 15-2-04	3.25	2.75	3.25 sellers
Sipiau Tin Co., Ld.	1899	$230,000	230,000	23,000	10	10	....	5 " for ½ year ending 30-6-03	5.25	5.00	5.25 buyers
The Belat Tin Mining Co., Ld.	1903	$300,000	300,000	30,000	10	10	....	....	....	....	6.00 sellers
Tronoh Mines, Ld.	1902	£160,000	149,185	160,000[5]	1	1	....	5/6 paid during 1905	....	....	22.00 sales
Duff Development Co., Ld.	1903	£400,000	350,000	400,000[6]	1	1	....	....	....	....	8.00 sellers
Rubber.											
Bukit Rajah Rubber Co.	1903	£70,000	61,000	70,000[13]	1	....	....	....	....	....	£2.15s.0d. sellers
Balgownie Rubber Estate Ltd.	1905	$200,000	100,000	20,000	10	5	....	....	....	....	$6.50 sellers
Cicely Rubber Estates Co	1904	£12,000	10,500	6,000	1	....	....	....	....	....	£1.13s. 6d. sellers
" " " 5% Pref.				6,000[14]	1	....	....	....	....	....	£1.15s. 0d. sellers
Pataling Rubber Estate Syndicate	1903	£30,000	17,500	30,000[15]	1	1	....	....	....	....	£2.15s. 0d. ......
Ribu Planting Co. Ld.	1904	$200,000	135,000	2.000[16]	100	100	....	....	....	....	$200.00 sellers
Sandycroft Rubber Co.	1904	$100,000	85,000	1,000[17]	100	100	....	....	....	....	$130.00 buyers
Selangor Rubber Co. Ltd.	1898	£30,000	26,000	30,000[18]	1	1	....	....	....	....	£5.10s. 0d. sellers
Singapore & Johore Rubber Co. Ld.	1903	$100,000	78,750	150	100	100	....	....	....	....	$100.00 ......
" " " " " " *Contrib.*				850	100	75	....	....	....	....	75.00 ......
Sungei Way Rubber Co. *Fully paid*	1904	£50,000	13.920	6,920	1	1	....	....	....	....	£2 0s. 0d. nom.
" " " " *Contrib.*				35,000[19]	1	4/-	....	....	....	....	18s. 0d. sales
Vallambrosa Rubber Co	1904	£60,000	50,000	60,000	1	....	....	....	....	....	£2.17s 6d ......
General.											
Fraser & Neave, Ld.	1898	$225,000	225,000	4,500	50	50	112,500	10 p. ct. and 2½ per cent bonus for '04	....	....	101.00 sellers
Hogan & Co., Ld.	1904	$480,200	334,800	3,348	100	100	5,000	7 per cent March 1905	75.00	70.00	70.00 sales
H'kong and Shanghai Banking Corporation	1865	£10,000,000	10,000,000	80,000	125	125	10,000,000[9] 6,500,000 250,000[10]	30s. div. and 10s. bonus at 1/11 9/16 =$25.46.42 per share for ½ year ending 31-12-04	....	....	825.00 ......
Howarth Erskine, Ld.	1901	$1,200,000	1,200,000	12,000	100	100	275,000	10 & 5 p. ct. bon. for yr. end. 30-6-05	....	....	255.00 nom.
Maynard & Co., Ld.	1901	$34,000	34,000	3,400	10	10	....	20 per cent for year ending 31-10-04	....	....	23.00 sellers
Riley, Hargreaves & Co., Ld.	1899	$875,000	875,000	6,000	100	100	150,000	10 p. ct. and 2½ p. ct. bon. for year '04	250.00	240.00	240.00 sales
" " " 7% Pref.				2,750	100	100	....	7 p. ct. for year 1904	....	....	115.00 buyers
Singapore Cold Storage Co., Ltd.	1903	$600,000	240,000	24,000[4]	10	10	....	....	....	....	8.00 sales
Singapore Dispensary Ld.	1891	$30,000	30,000	600	50	50	19,000	12½ per cent for year ending 31-7-04	....	....	77.50 buyers
Straits Ice Co., Ld.	1884	$200,000	200,000	2,000	100	100	22,000	5 " interim for 1905	....	....	150.00 buyers
Straits Steam Ship Co., Ld.	1890	$500,000	421,500	5,000[7]	100	100	400,000 169,228[11]	5 p. ct. interim for 1905	147.50	145.00	145.00 sales
Straits Trading Co., Ld.	1887	$3,000,000	2,500,000	300,000[8]	10	10	700,000 1,021,395[12]	10 p. ct. & 50 cts. bon. ½ yr. end 31-3-05	42.50	42.25	42.50 sales
Tanjong Pagar Dock Co., Ld.	1864	$3,700,000	3,700,000	37,000	100	100	1,950,000	$20 for half year ending 31-12-04	....	....	385.00 buyers
Debentures. $											
Howarth Erskine Ld. 7 per cent ... 250,000	....	....	....	....	....	....	....	....	....	....	3 per cent prem.
Singapore Municipal 6 " ... 400,000	....	....	....	....	....	....	....	....	....	....	... " nominal
" " 5 " ... 1,878,000	....	....	....	....	....	....	....	....	....	....	2 " prem. buyers
" " 4 " ... 602,300	....	....	....	....	....	....	....	....	....	....	2 " dis. nominal
Riley, Hargreaves & Co., Ld. 6 p. cent 225,000	....	....	....	....	....	....	....	....	....	....	3 " prem. buyers
Tanjong Pagar Dock Co., Ld. 6 " 250,000	....	....	....	....	....	....	....	....	....	....	2 " prem. sales
" " " " 5 " 1,365,500	....	....	....	....	....	....	....	....	....	....	1 " prem.

---

[1] 3,500 unissued.
[2] 13,300 "
[3] 2,000 "
[4] 36,000 unissued.
[5] 10,815 "
[6] 50,000 "
[7] 785 unissued.
[8] 50,000 "
[9] Special Gold Reserve Fund.
[10] Insurance Fund.
[11] Sundry Reserves.
[12] Sundry Reserves.
[13] 9,000 unissued.
[14] 1,500 "
[15] 12,500 " Mortgage £5,000
[16] 650 unissued.
[17] 150 "
[18] 4,000 "
[19] 8,080 "

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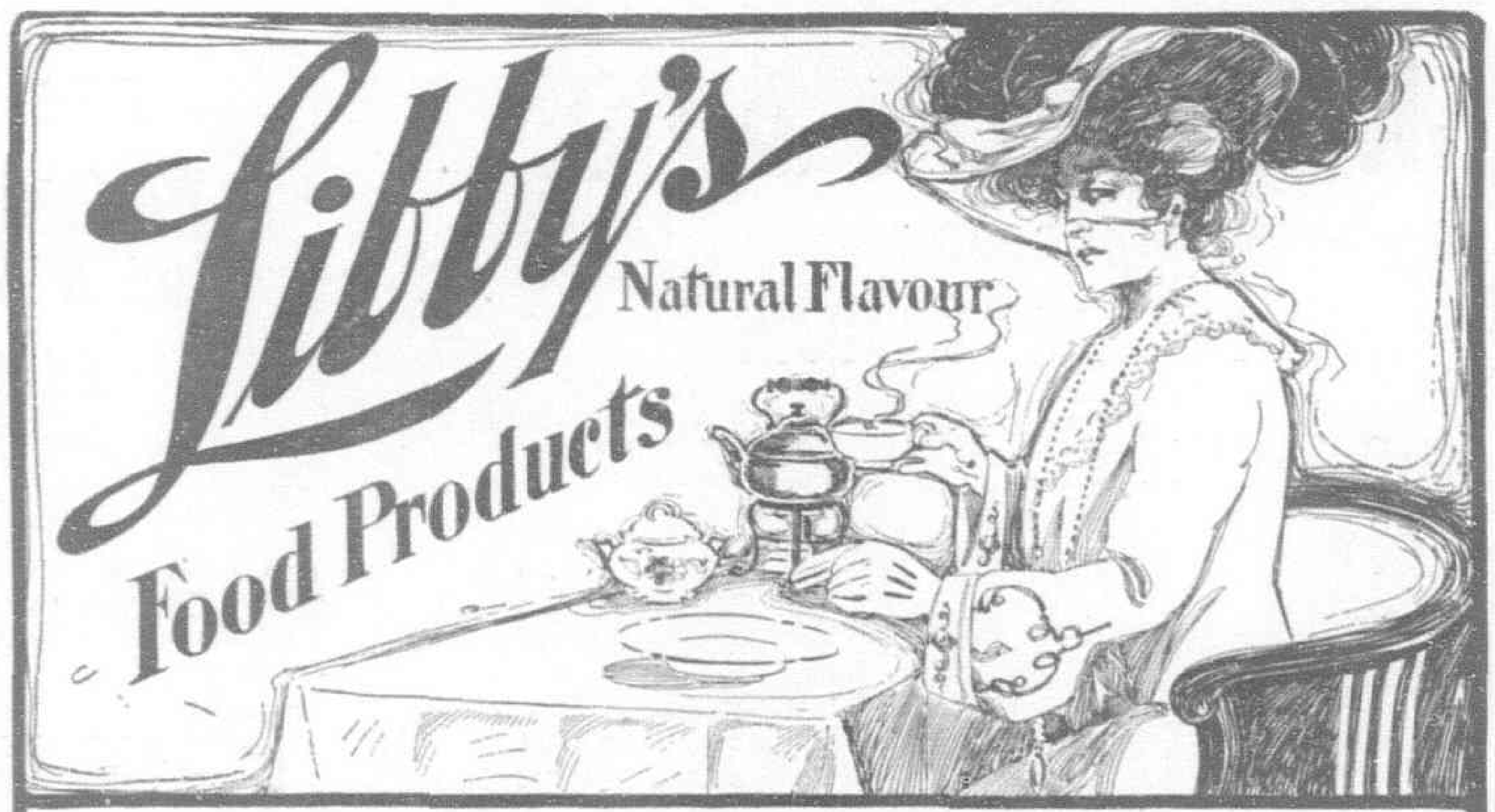

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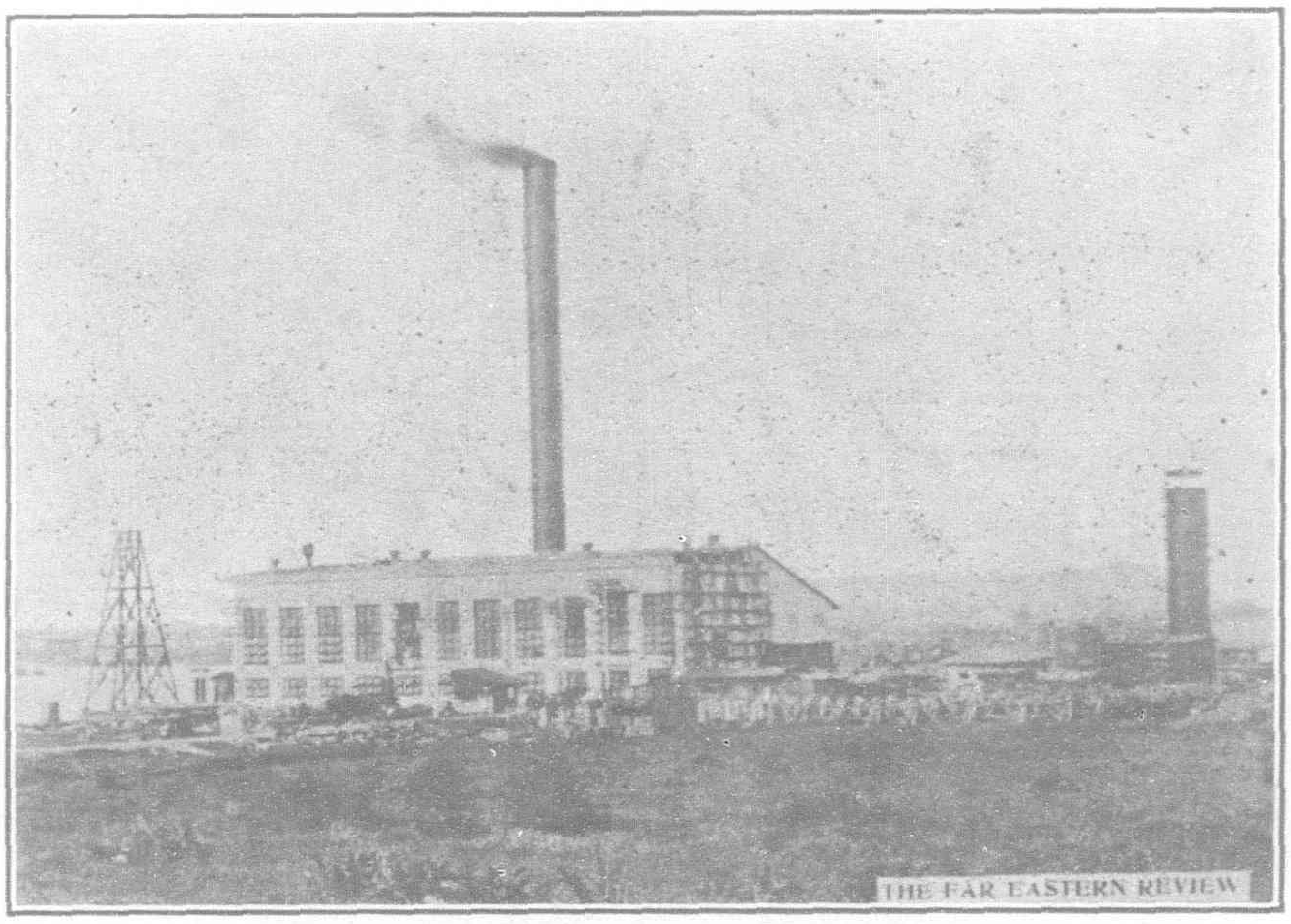

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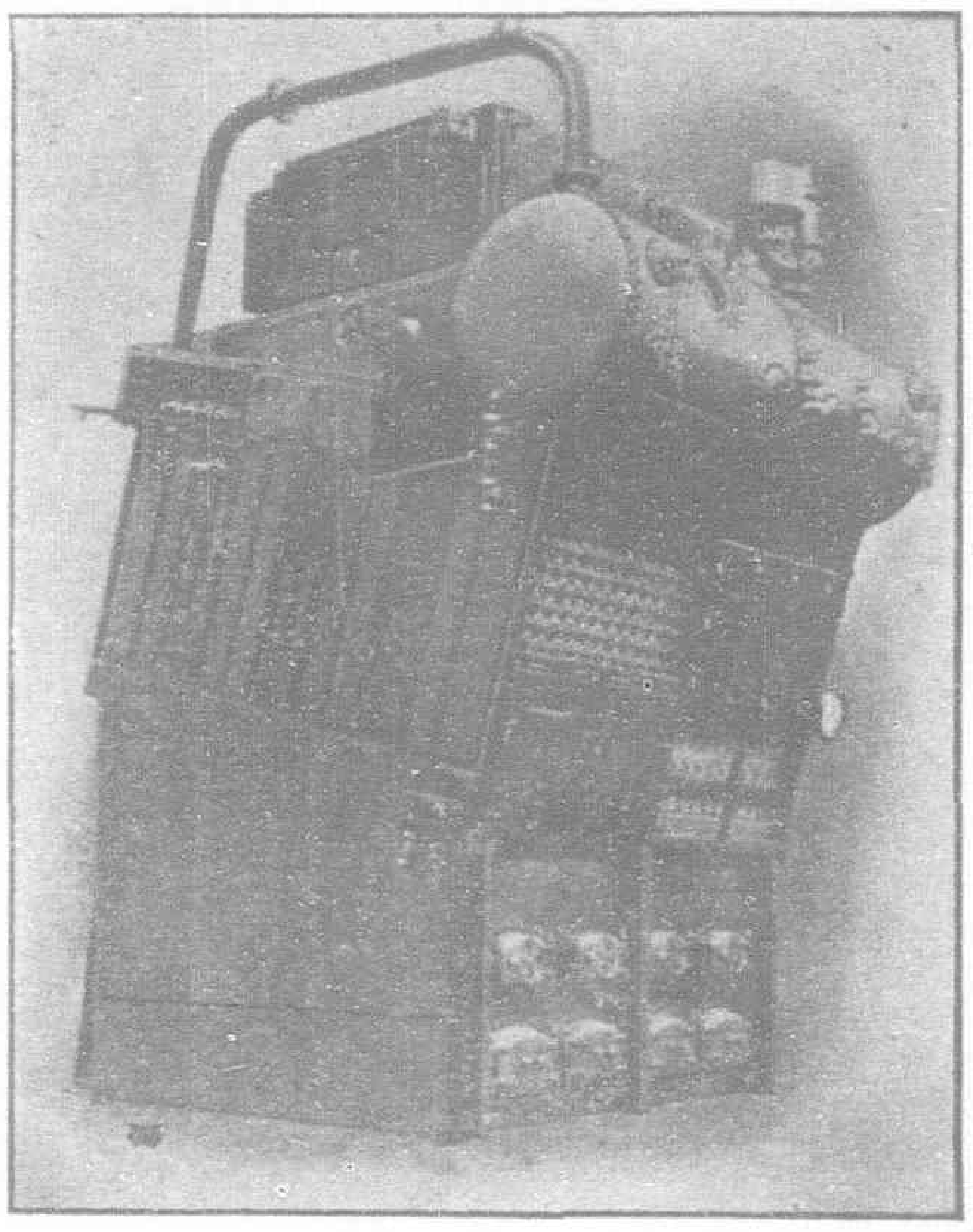

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- Superheaters.
- Feed-Water Heaters.
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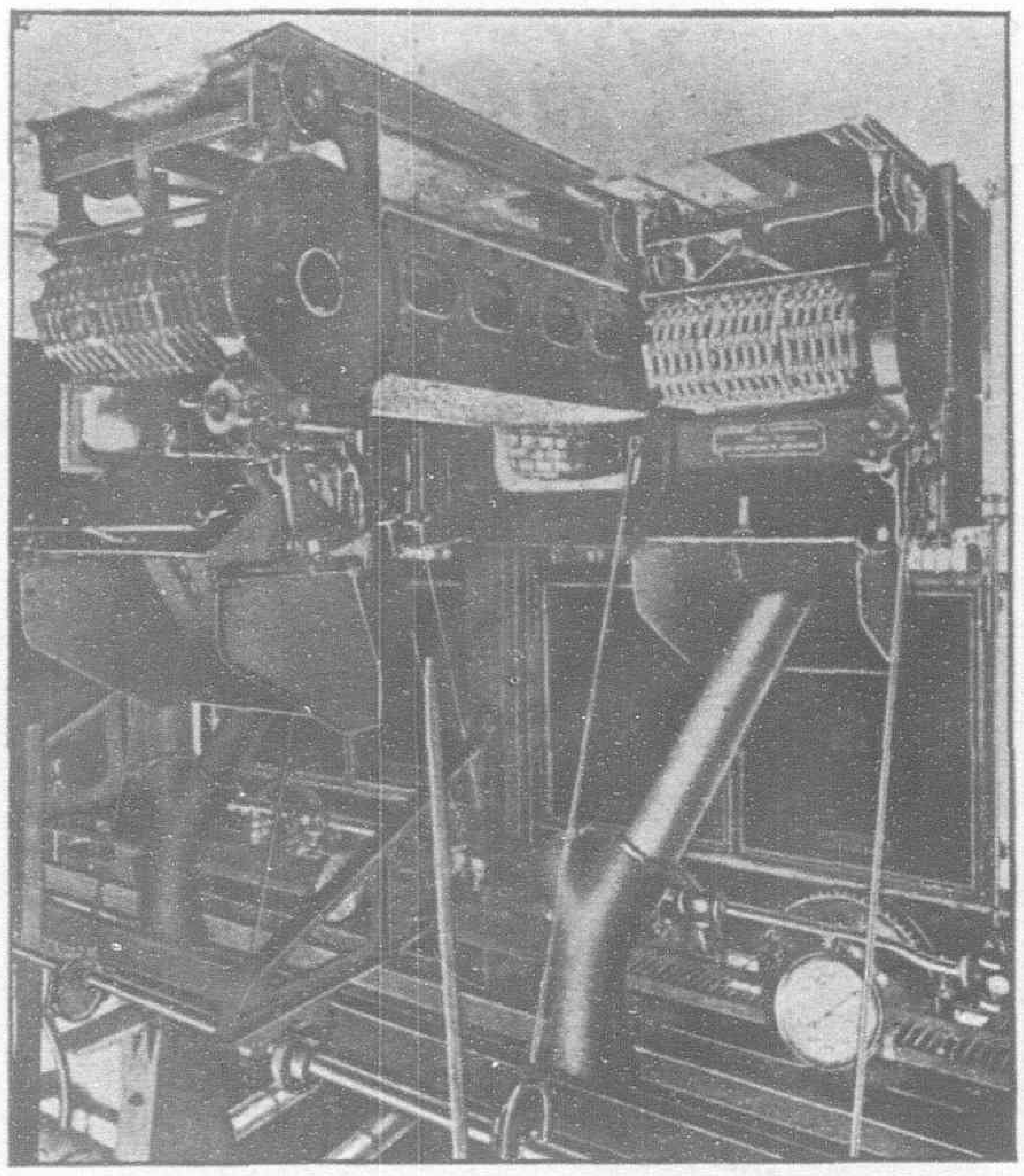
Patent Water-Tube Boilers



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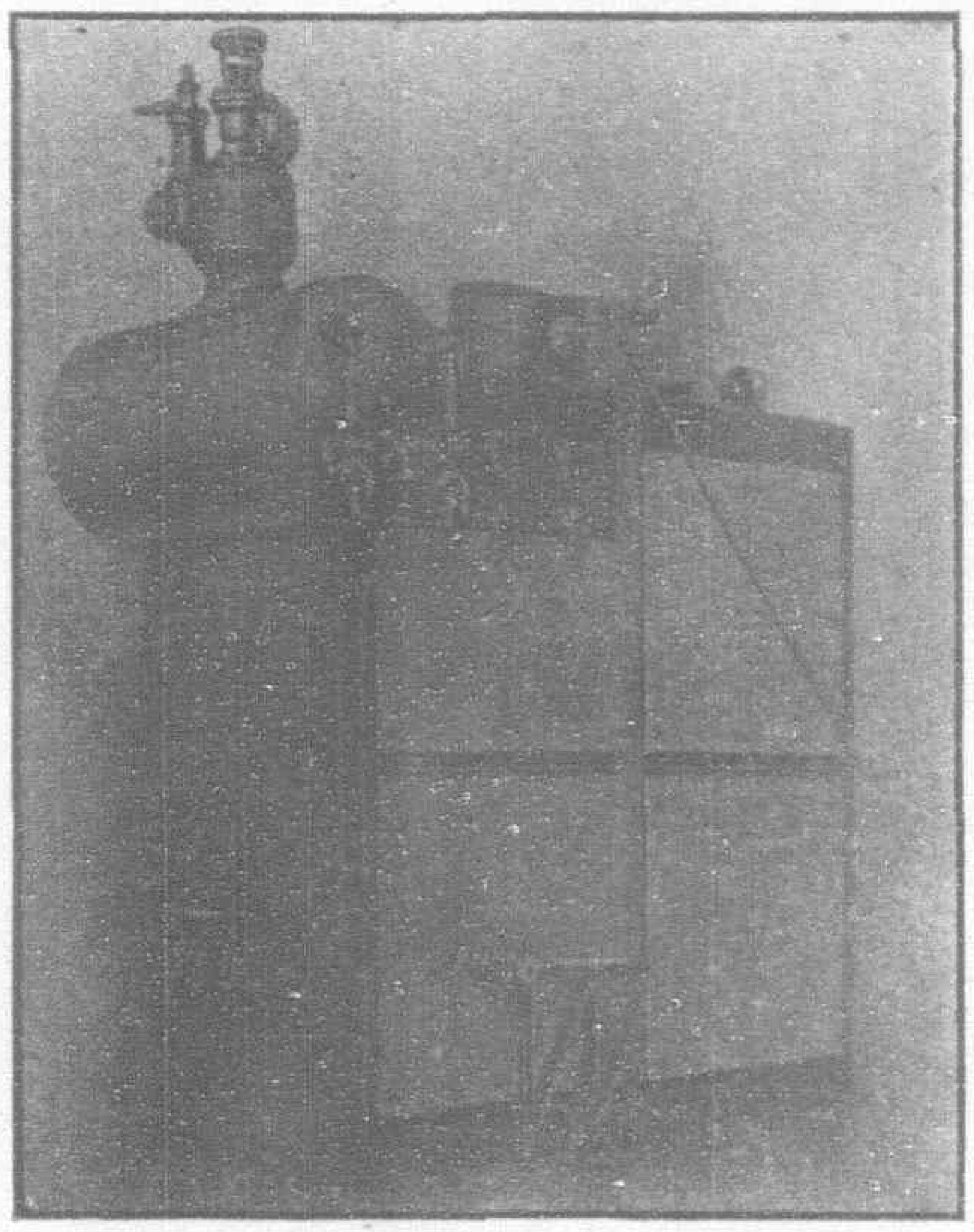

PORTABLE TYPE, REAR VIEW

Patent Portable Boiler

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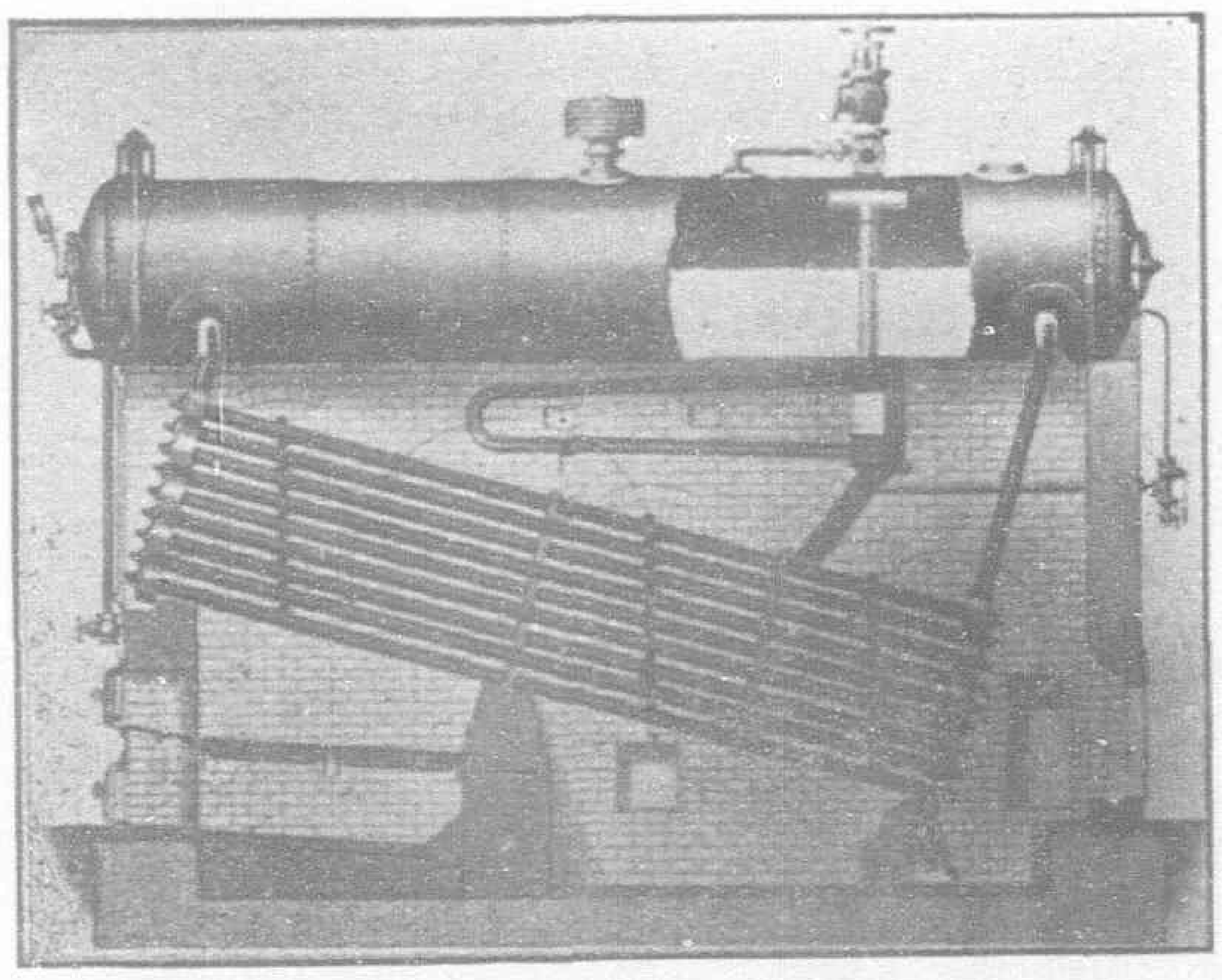
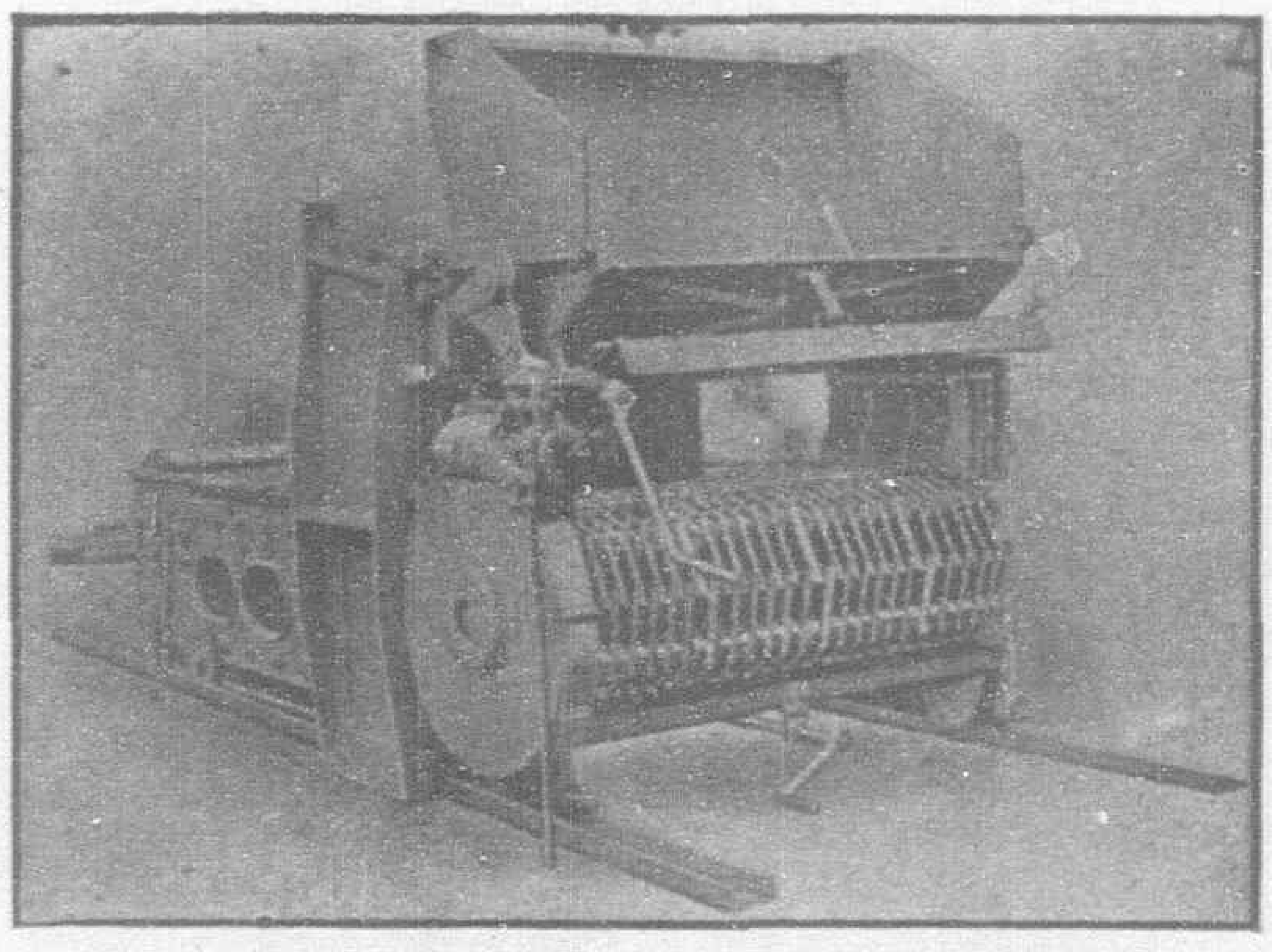


STANDARD LAND TYPE BOILER OF WHICH SOME 35,000 HAVE BEEN MADE



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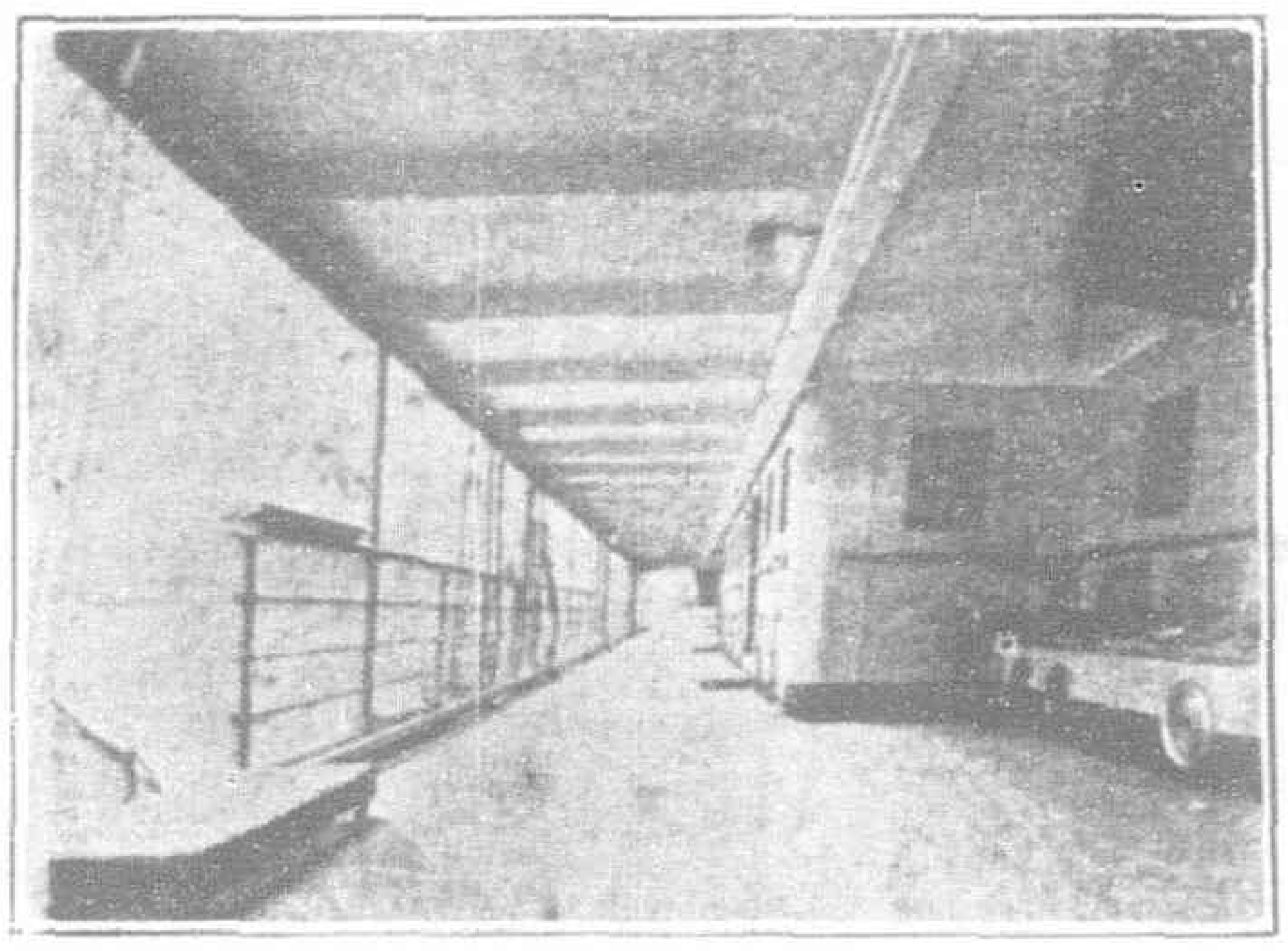

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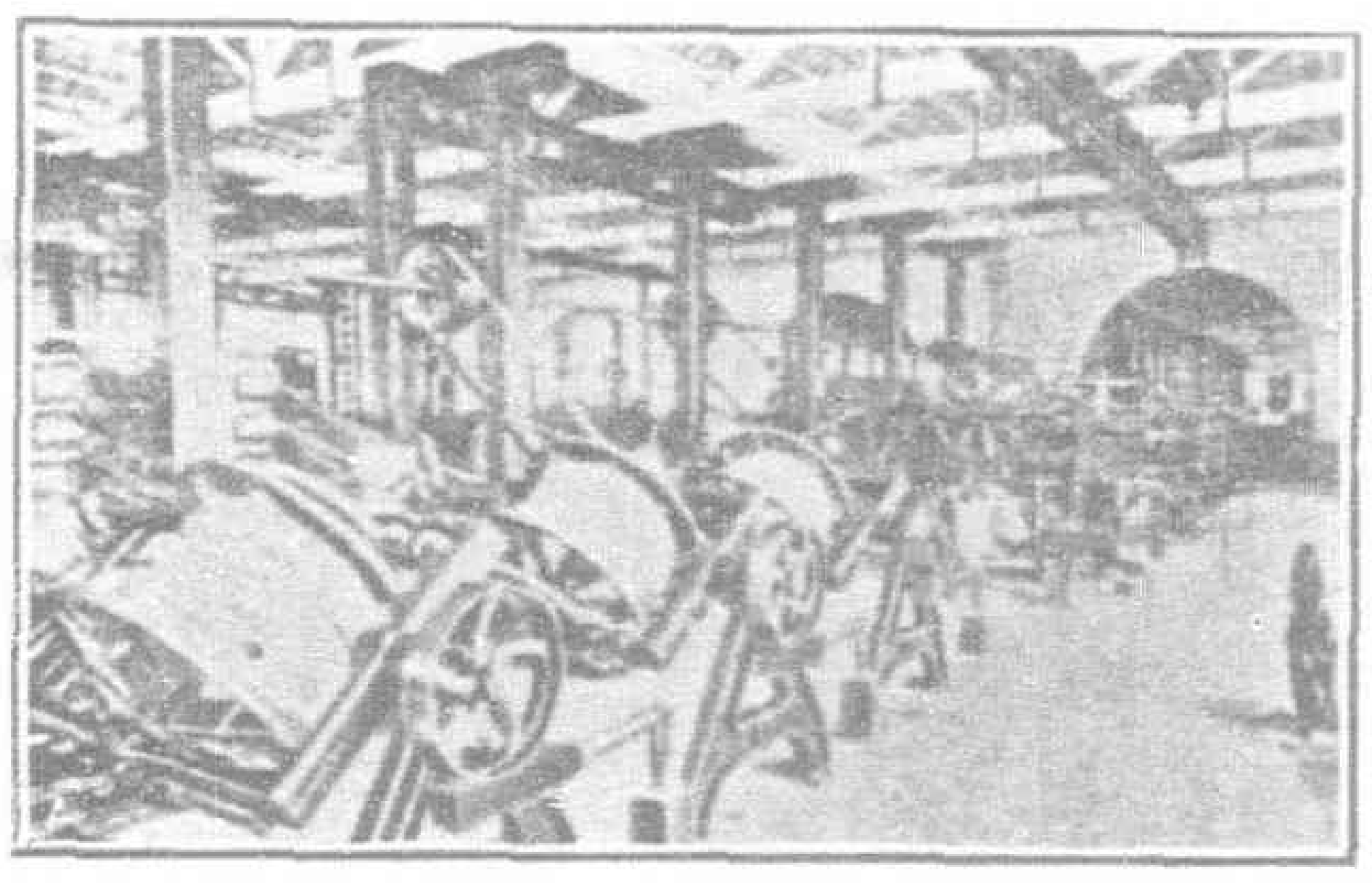

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OFFICE OF THE MUNICIPAL BOARD

Manila, P. I., July 20, 1905.

Sealed **BIDS** or **PROPOSALS** will be received by the Secretary of the Municipal Board until 12 o'clock m. January 2, 1906, and thereupon opened, for the furnishing of materials for and the construction of a gravity water supply for the city of Manila, Philippine Islands.

The proposed work will consist of a masonry dam and inlet chamber; a steel pipe line forty-two inches in diameter and approximately ten and one-half miles long; a masonry conduit in tunnel and open cut about four and one-half miles long; a receiving and distributing reservoir; and the necessary gates, gatehouses, and appurtenances.

Specifications, general plans, and blank forms of proposal may be obtained at the office of the Secretary of the Municipal Board, Manila, P. I., or from the Chief of the Bureau of Insular Affairs, Washington, D. C.

Each bid shall be accompanied by a certified check for twenty thousand dollars ($20,000) as a guaranty that the bidder, if awarded the contract, will, after due notification, promptly enter into contract and furnish an acceptable bond in the sum of twenty (20) per cent of the sum total of contract price for the faithful performance of the work.

The right is reserved to reject any or all bids.

G. S. LANE,
Acting Secretary, Municipal Board.

J. F. CASE,
Chief Engineer, Department of Sewer and Waterworks Construction.

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OFFICE OF THE MUNICIPAL BOARD

Manila, August 1, 1905.

Sealed BIDS or PROPOSALS will be received until 12 m. January 12, 1906, for the construction of a system of sewers and appurtenances for the city of Manila, Philippine Islands.

The total length of sewers will be approximately 52 miles, of which 7.5 miles will be of brick and concrete sewer ranging in size from 4.75 feet in diameter to 2 by 3 feet egg-shaped and laid at depths from 12 to 20 feet below the surface; and 43 miles will be of pipe sewers, from 8-inches to 24-inches in diameter, laid at depths of from 5 to 18 feet.

In addition to this there will be one 42-inch cast-iron outfall pipe 6,500 feet in length laid below the bed of the harbor on a pile foundation; besides one double line of 24-inch flexible-joint cast-iron, 650 feet in length, crossing the Pasig River.

The above work will be let as one contract, and each proposal must be accompanied by a certified check for $50,000, drawn on a local bank, or a bond drawn for a like amount signed by a fidelity insurance company authorized to give such bonds in the Islands, and no bid shall be considered unless such check or bond accompany it.

A surety-company bond for an amount equal to 20 per cent of the gross amount of the contract will be required of the successful bidder.

Specifications, general plans, and blank forms of proposals may be obtained at the office of the Board after August 1, 1905. Plans and specifications may be seen at the office of the Bureau of Insular Affairs, War Department, Washington, D. C.

The right is reserved to reject any or all bids.

G. S. LANE,
Acting Secretary, Municipal Board.

J. F. CASE,
Chief Engineer, Department of Sewer and
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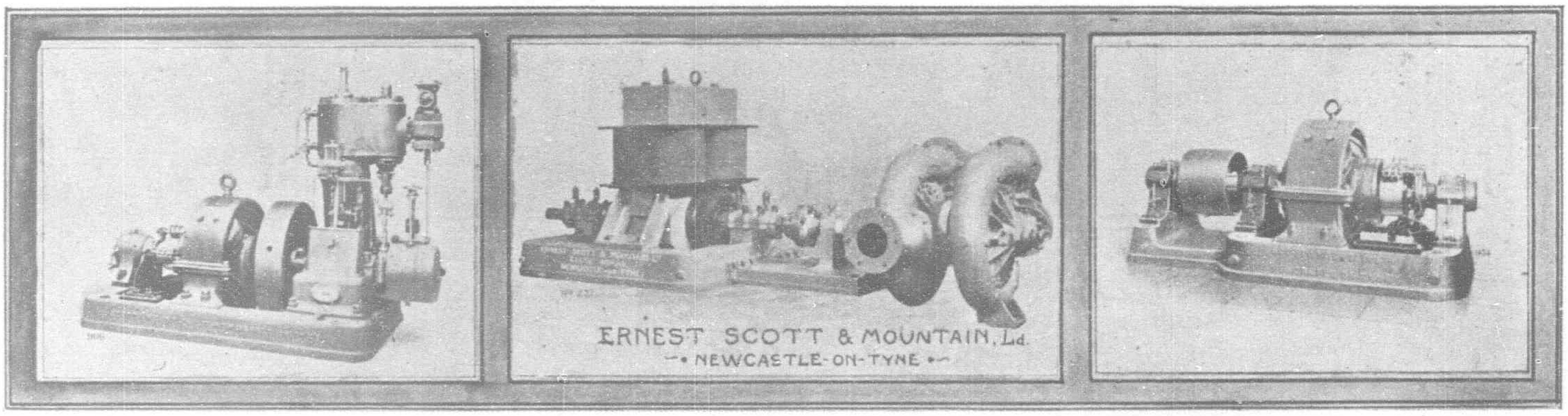

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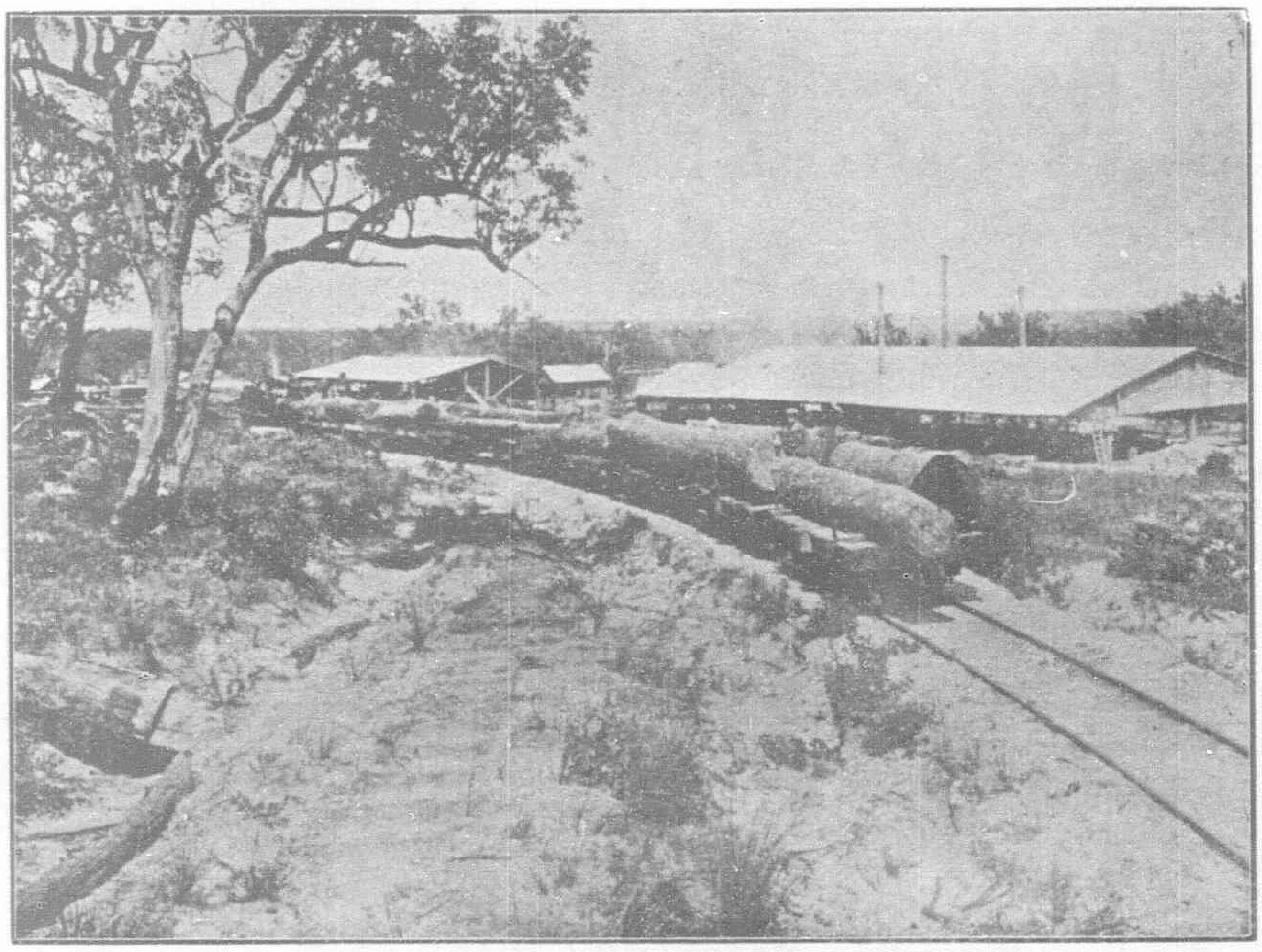

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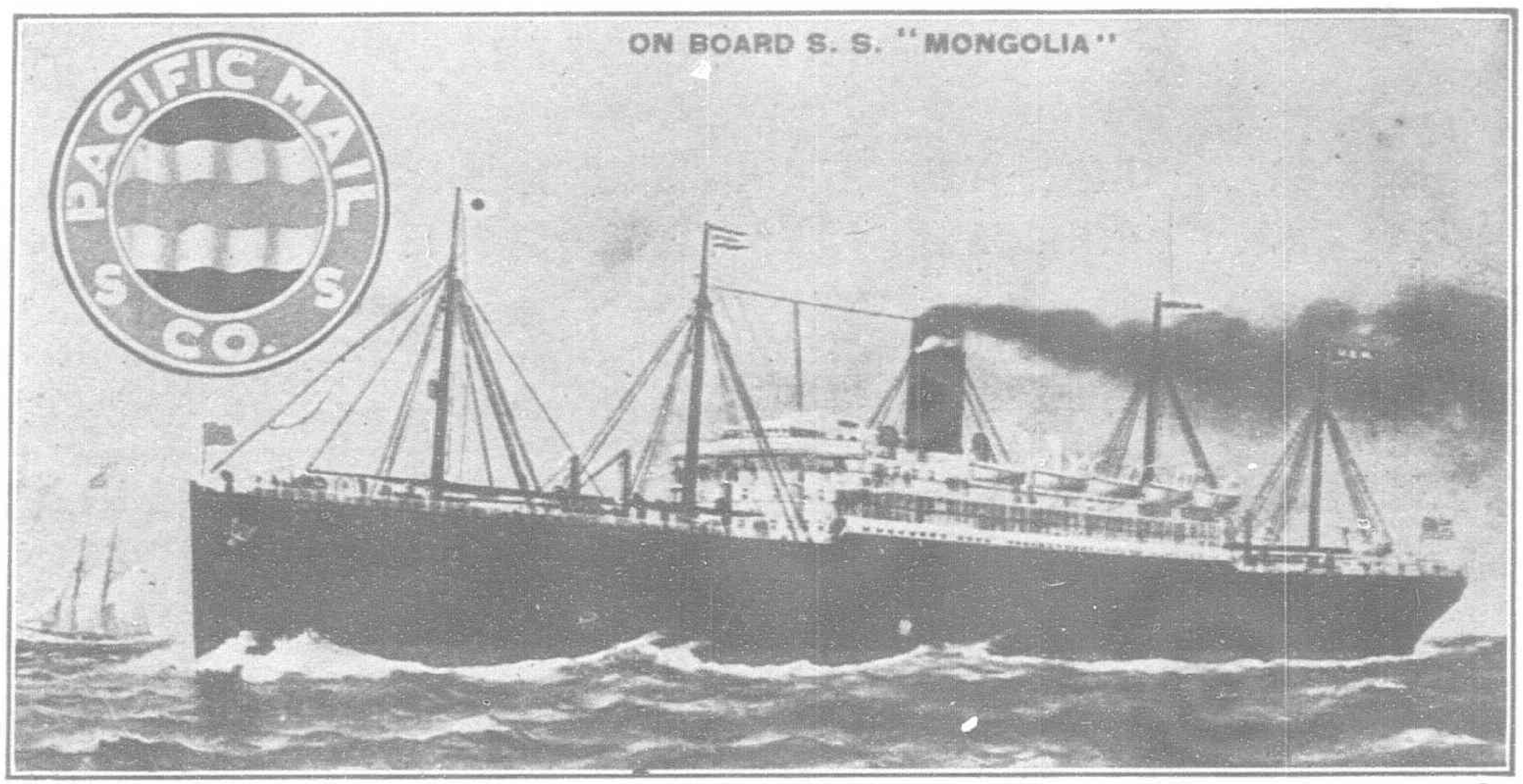
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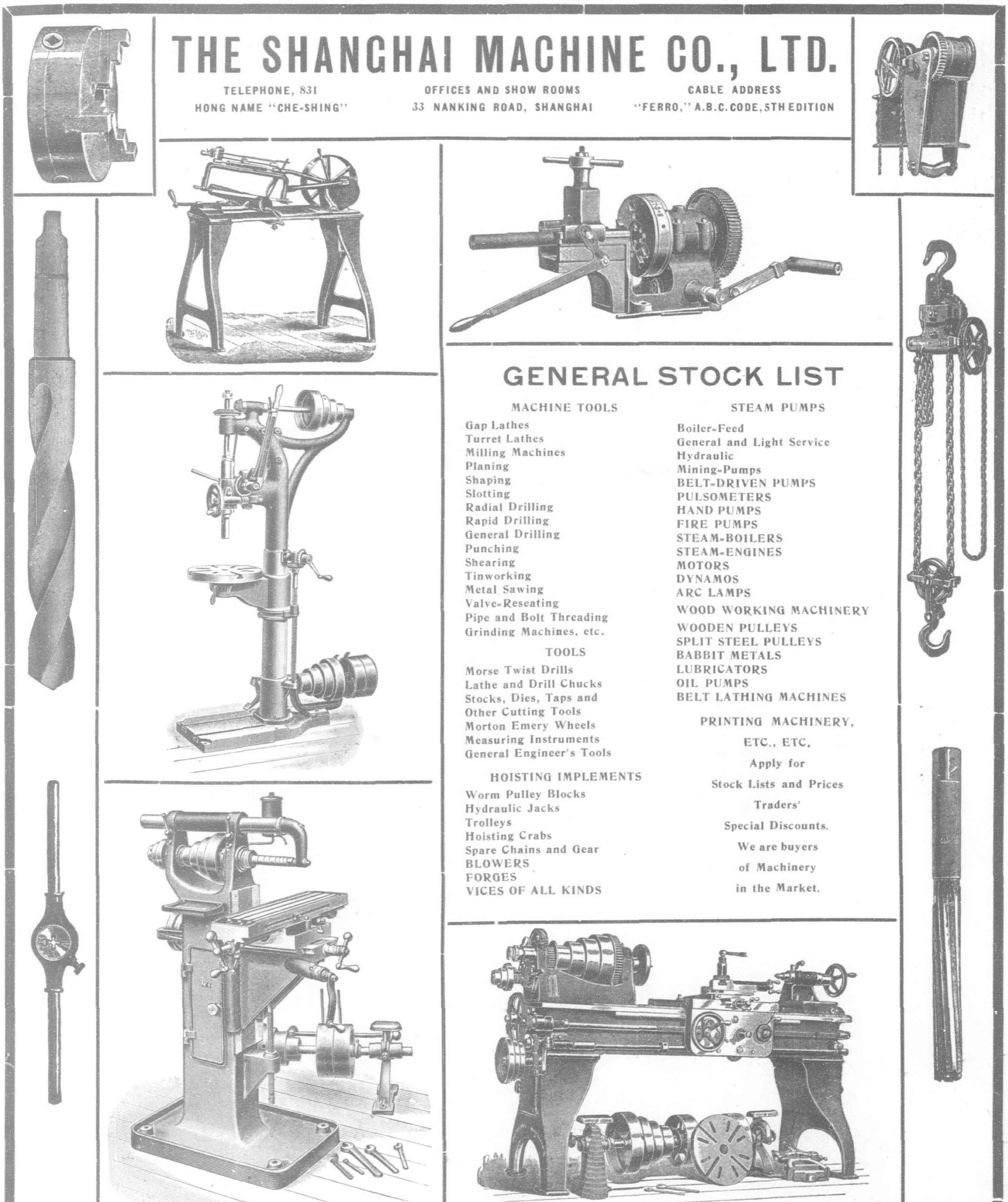

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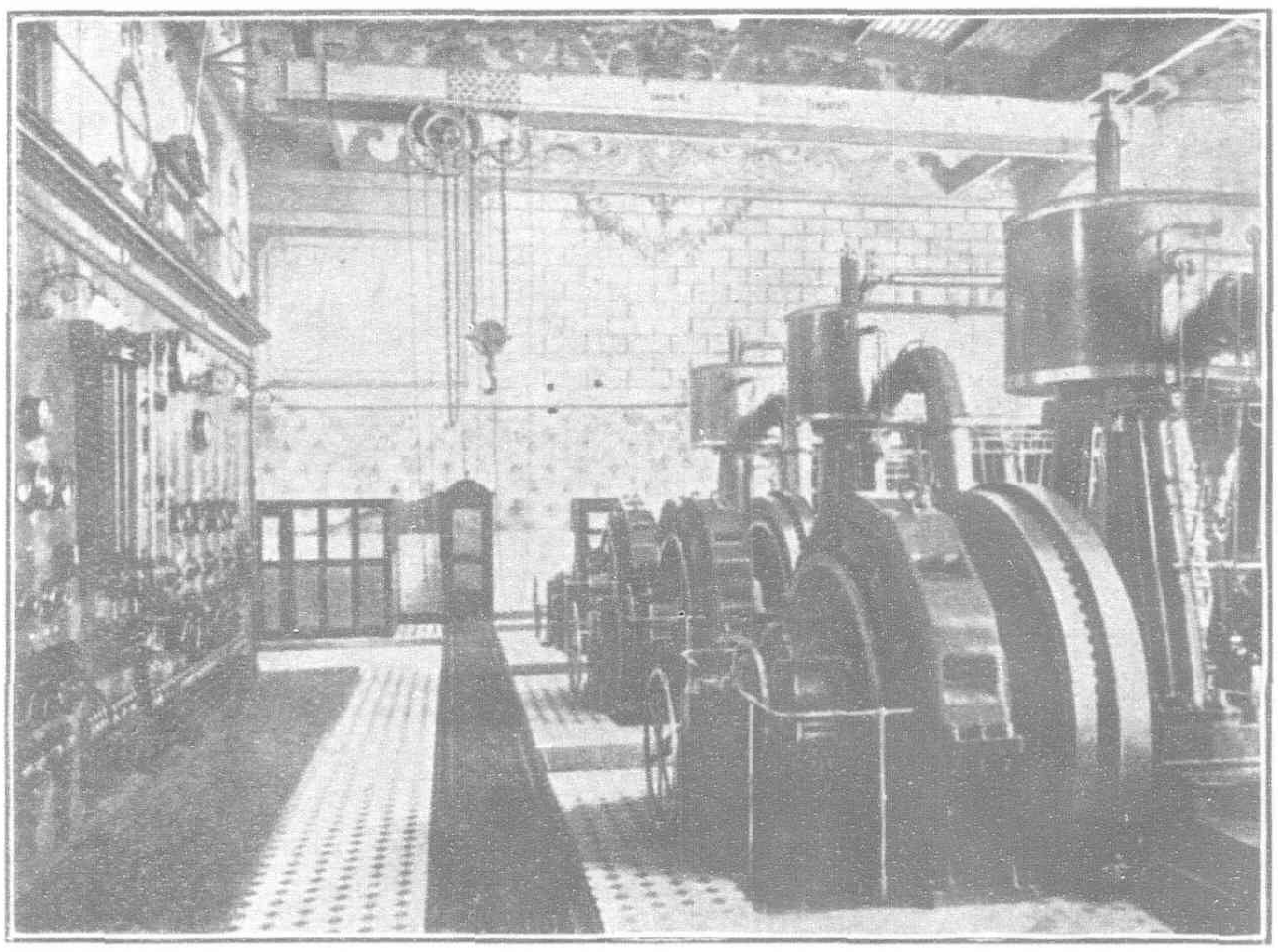

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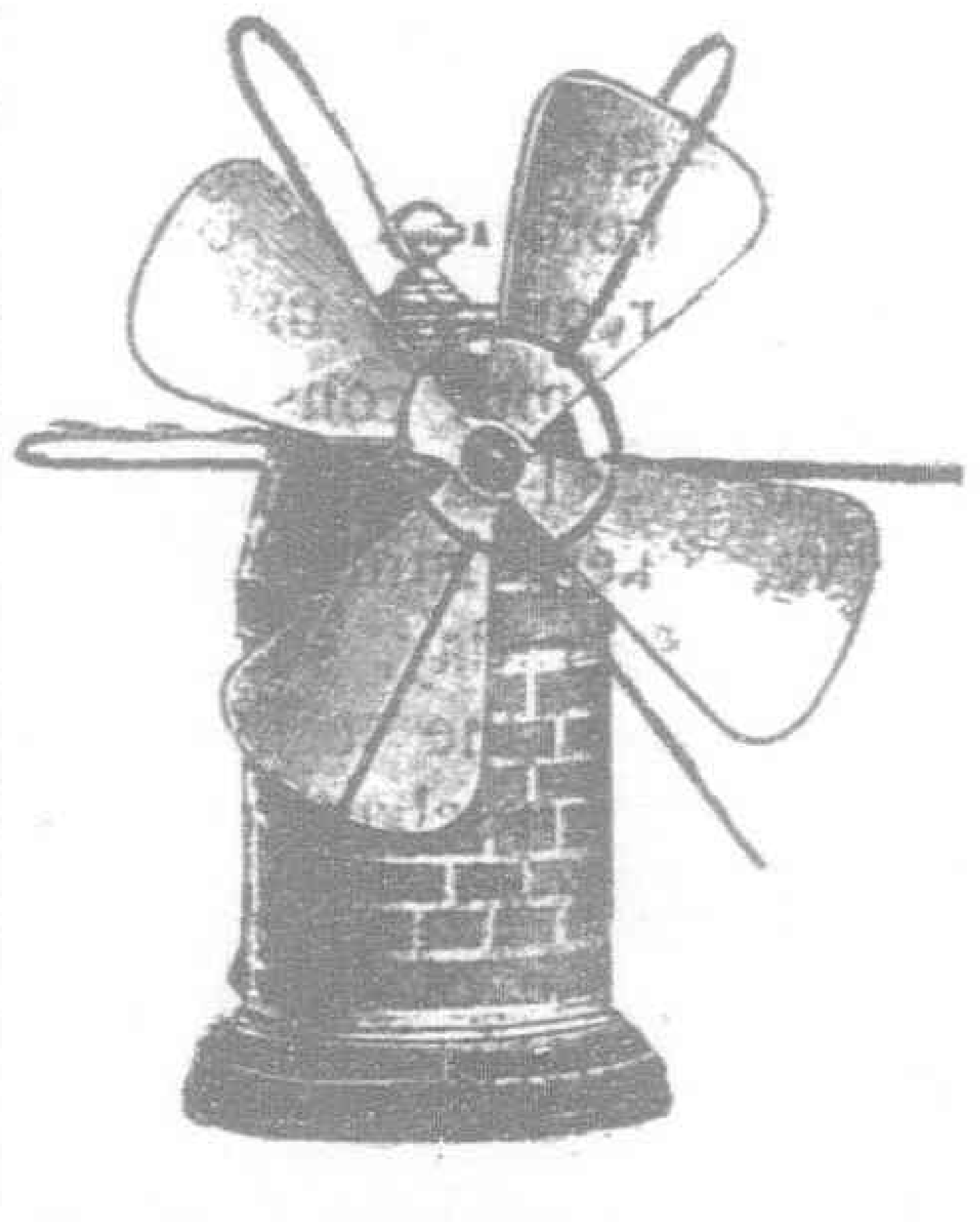

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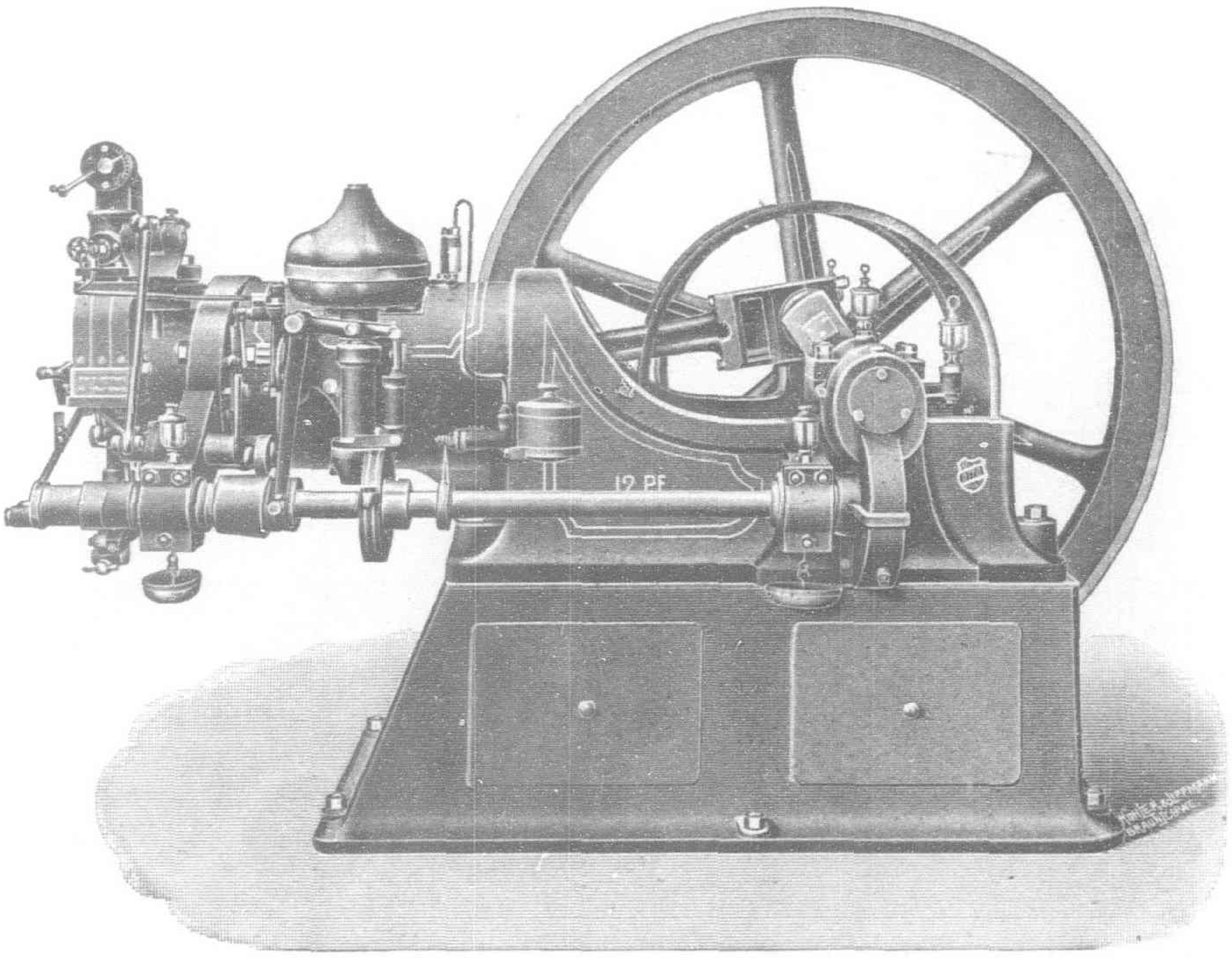

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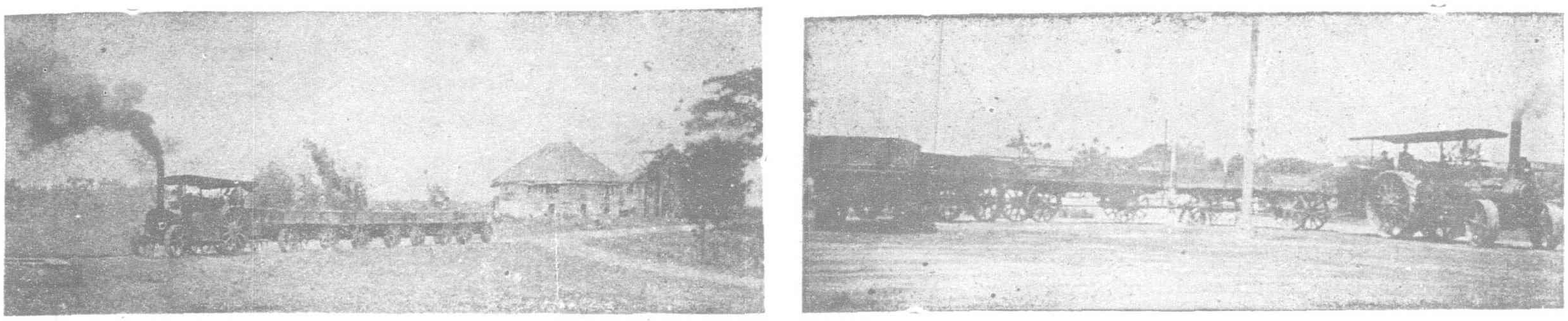

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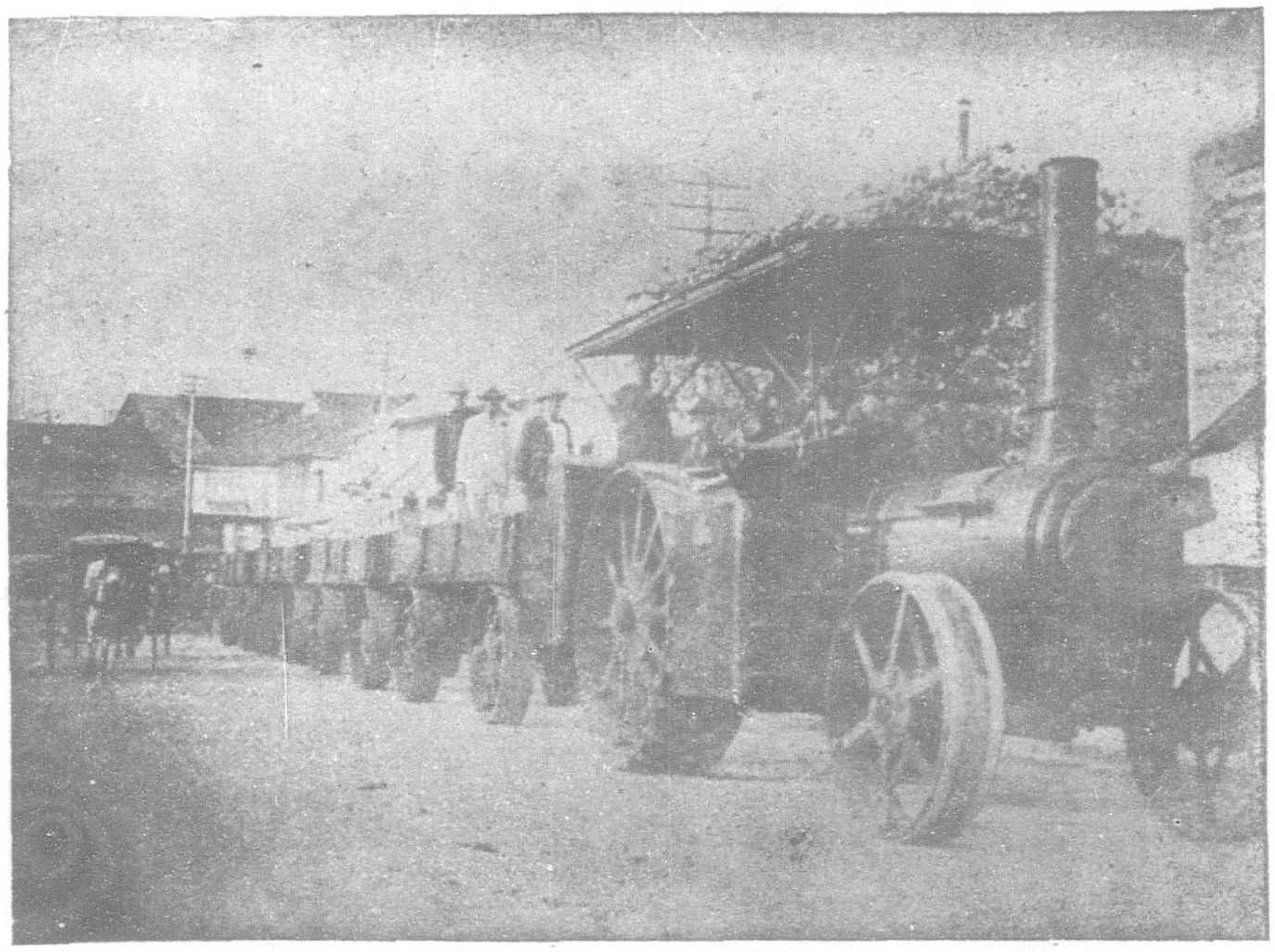

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COURTESY A. C. HUTTON POTTS, SHARE AND GENERAL BROKER, YOKOHAMA, AUGUST, 1905.

STOCKS.	CAPITAL.	NO. OF SHARES.	ISSUE VALUE.	AMOUNT PAID UP.	RESERVE FUND.	AT WORKING ACCOUNT OR CARRIED FORWARD.	DATE.	LAST DIVIDEND.	FOR TERM.	CLOSING QUOTATION.
	Y.		Y.	Y.						
Brett & Co., Limited	28,000	2800	10	10			30/6/03	6%	for 1 year	7 Nominal.
Club Hotel, Limited	185,000	1850	100	100			31/3/04	7%	,, 1 year	45 Nominal.
Grand Hotel, Limited	250,000	2500	100	100		Y.2,608.34	30/6/05	6%	,, ½ year	210 Sales.
Helm Bros., Limited	186,000	3720	50	50		Y.8,349.06	31/12/04	17½%	,, 1 year	75 Nominal.
Langfeldt & Co., Limited	150,000	1500	100	100		Dr.30,174.81	30/6/05		,, ½ year	30 Buyers.
C. Nickel & Co., Limited	125,000	5000	25	25		10,572.91	31/10/04	16%	,, 1 year	35 Nominal.
Japan Brewery Company, Limited	450,000	9000	50	50	170,000	4,781.87	31/12/04		,, 1 year	85 Buyers.
Yokohama Engine and Iron Works	130,000	2600	50	50	20,000	Y.5,935.35	31/5/05	20%	,, 1 year	75 Buyers.
Hirano Mineral Water Co., Ltd	125,000	5000	25	25				1st year		25 Sellers.
Oriental Hotel, Ltd., Old Ordinary	251,000	1490	50	50	47,819.90		31/8/04	12%	,, 1 year	75 Nominal.
,, ,, New ,,		1510	50	25						
,, ,, Old Preference		750	50	50				8%		63 Sales.
,, ,, New ,,		1250	50	25						
,, ,, Founders		80	12½	12½				Y.37		500 Sales.

DEBENTURE LOANS.	AMOUNT OF LOAN.	FACE VALUE OF DEBENTURES.	RATE OF INTEREST.	INTEREST PAYABLE.	CLOSING QUOTATION.
Japan Brewery Company, Limited	200,000.00	100.00	7%	1 April and 1 October.	108 Sales.
Brett and Company, Limited	11,500.00	100 00	7%	1 June and 1 Dec.	95 Sellers.
Yokohama United Club	250,000.00	100.00	7%	30 June and 31 Dec.	108 Sellers.
C. Nickel and Company, Limited	50,000 00	100.00	8%	1 May and 1 Nov.	110 Sellers.

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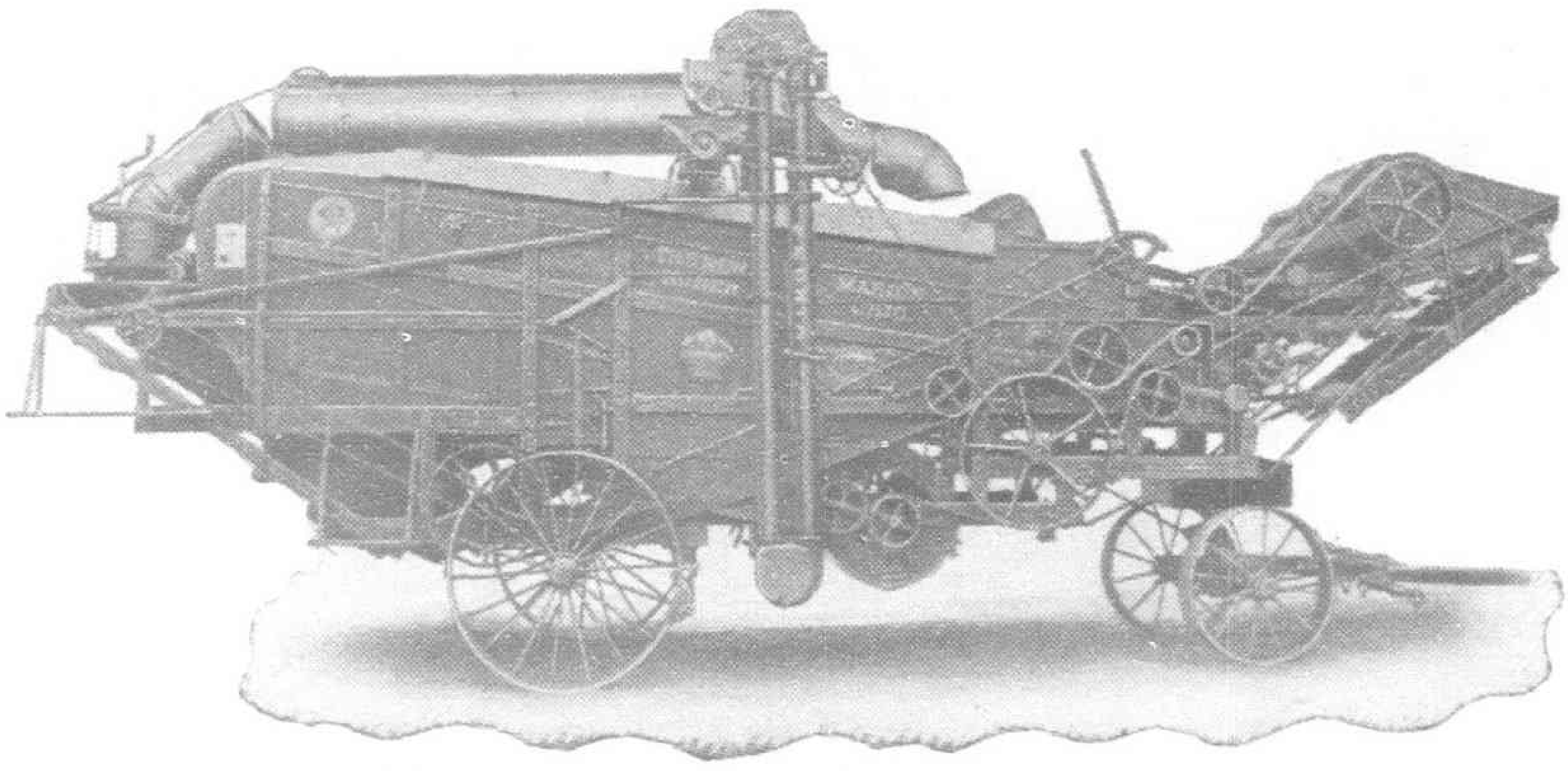

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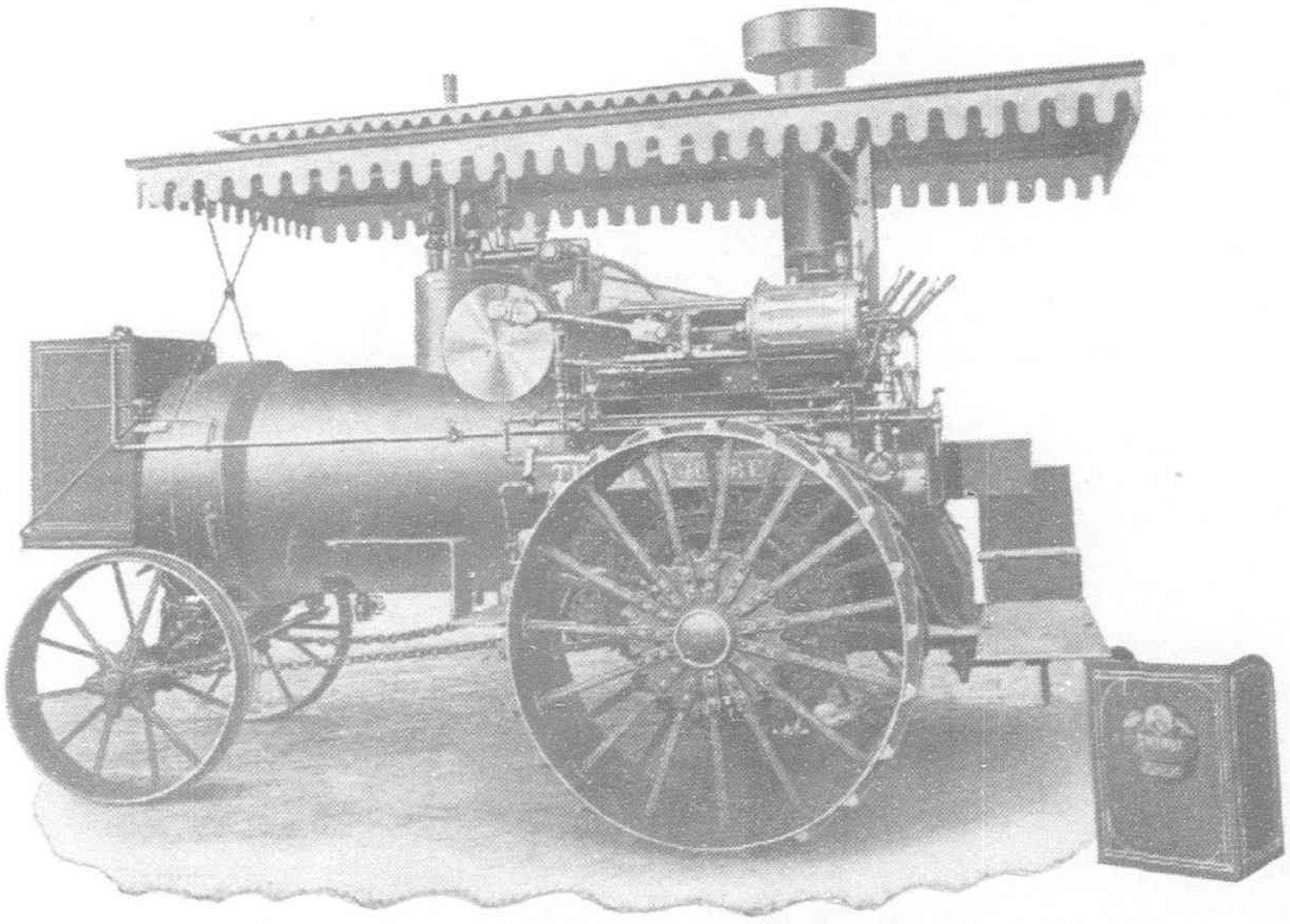

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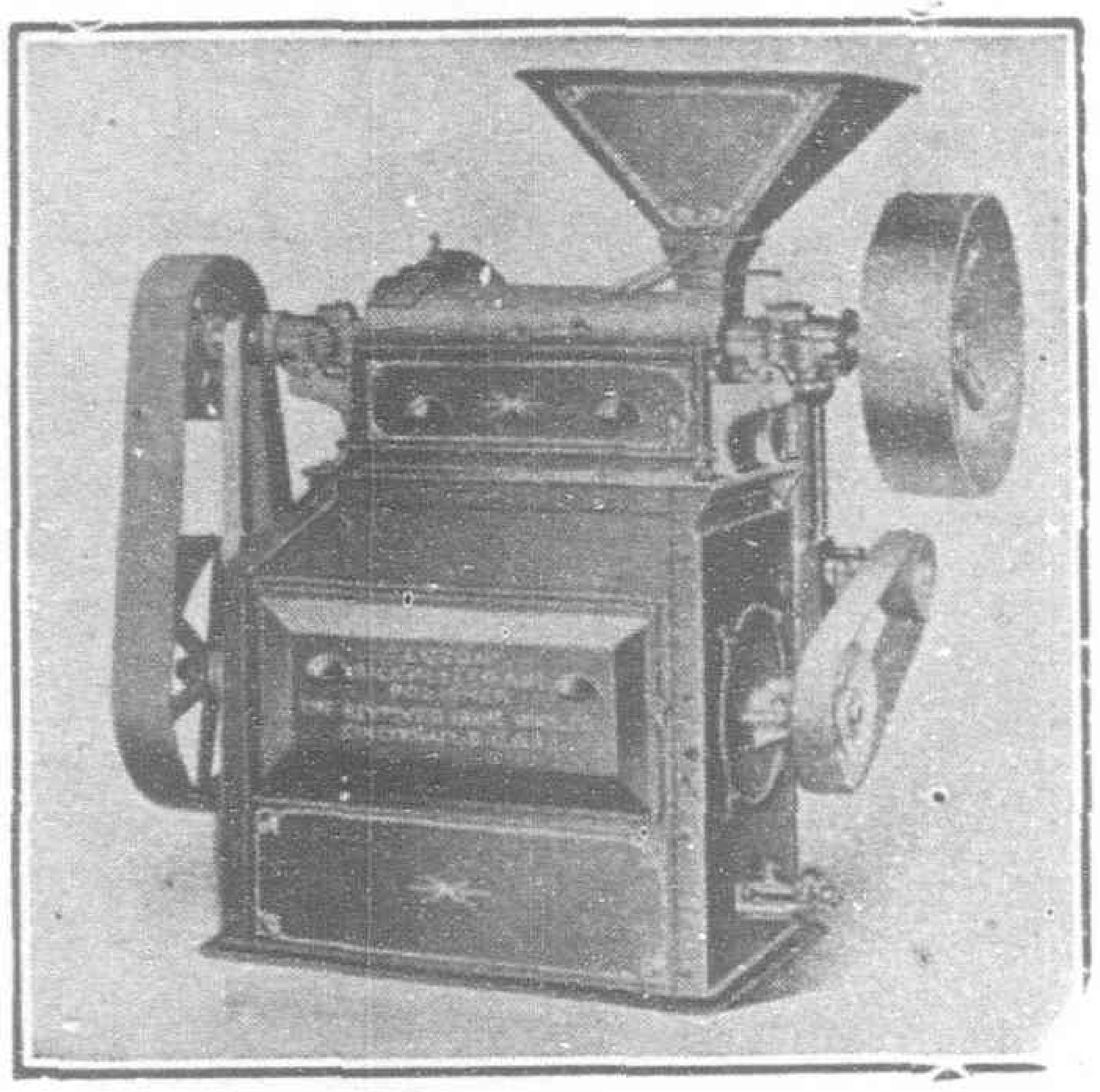

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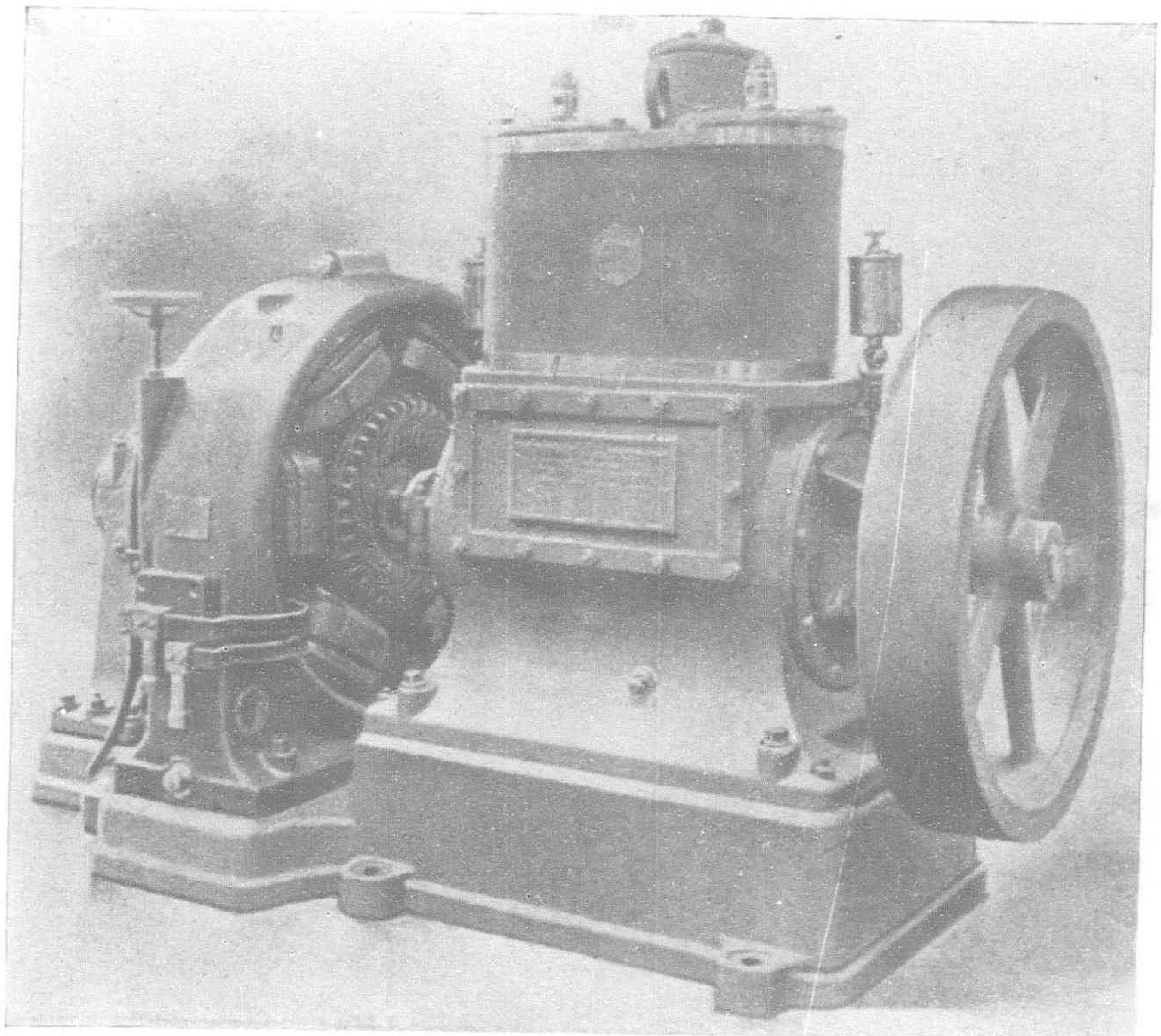

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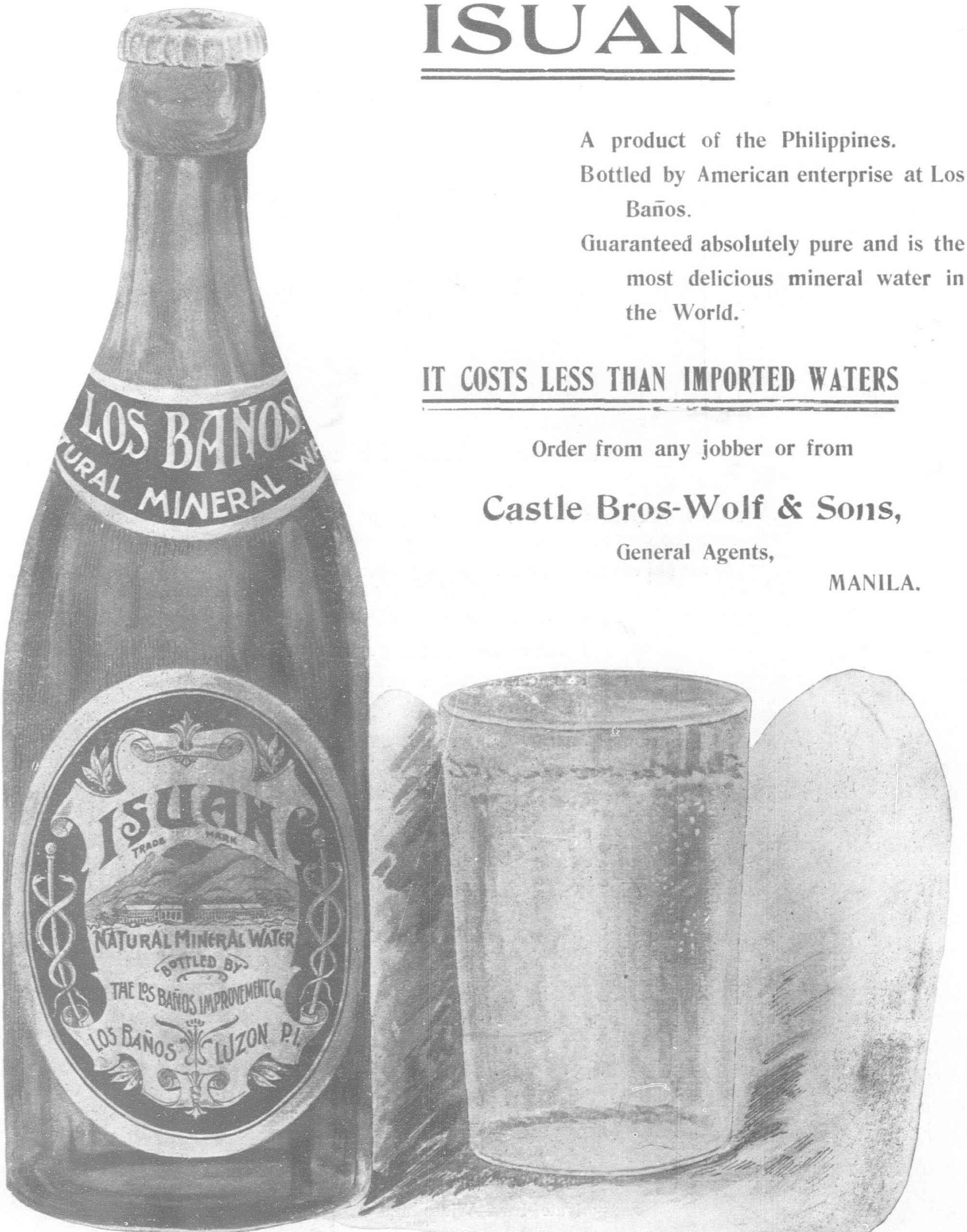

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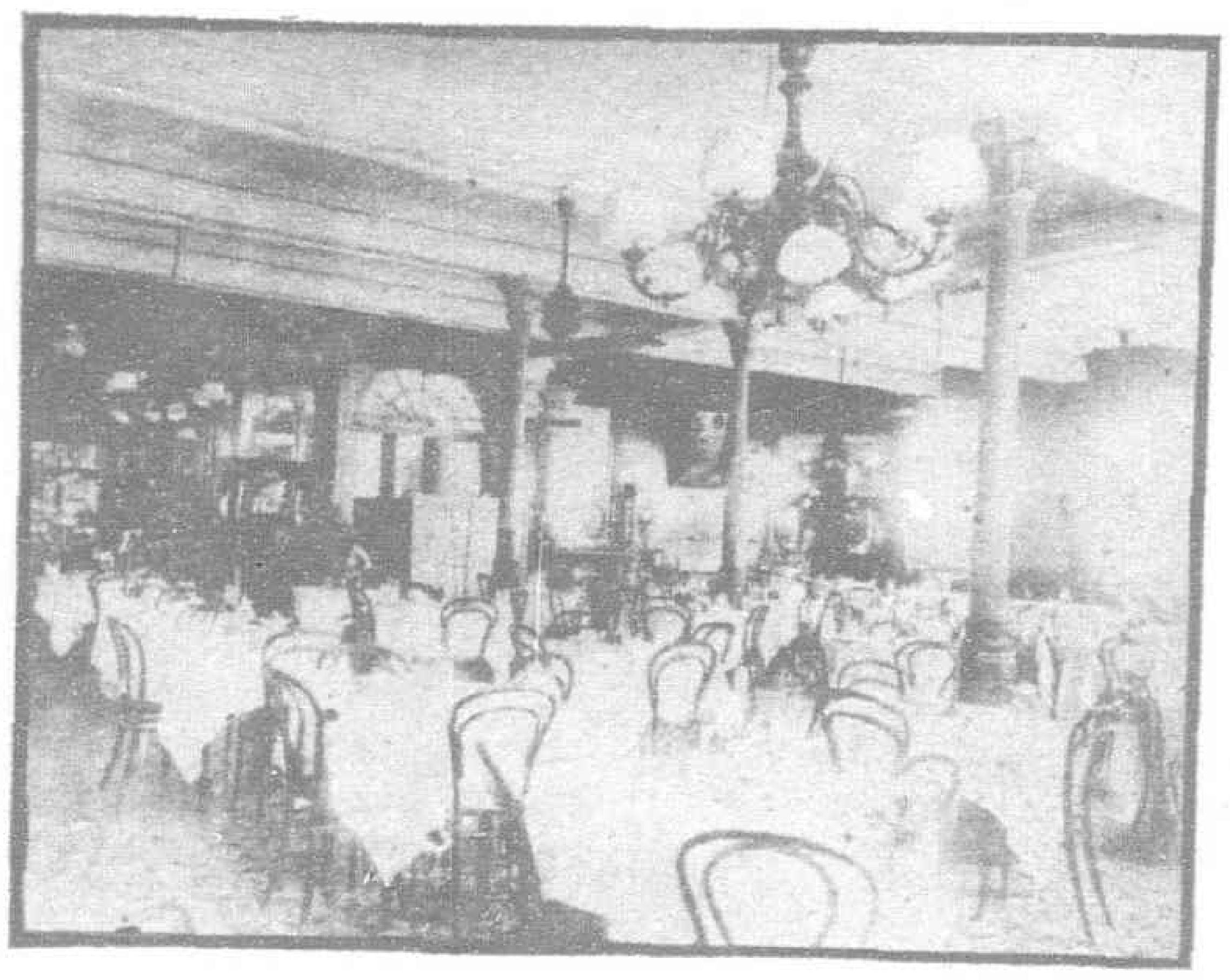

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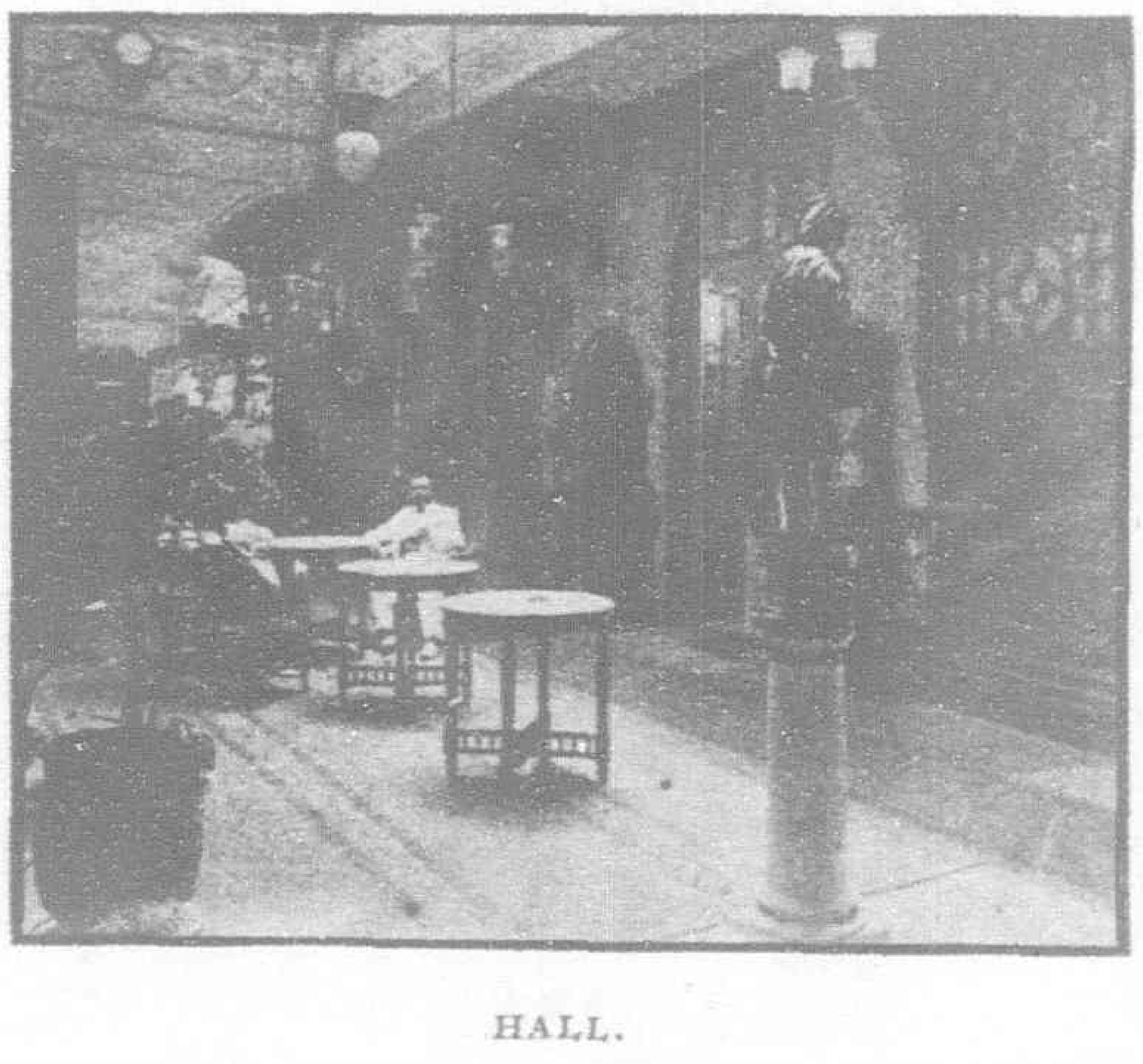

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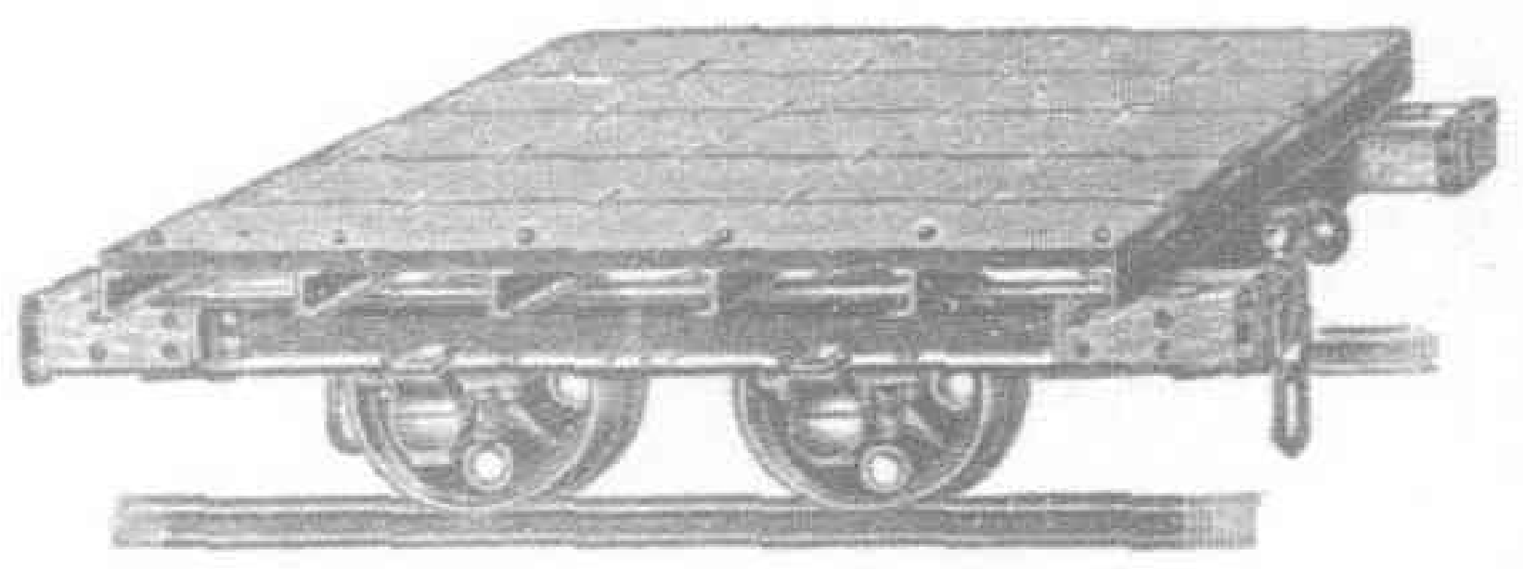

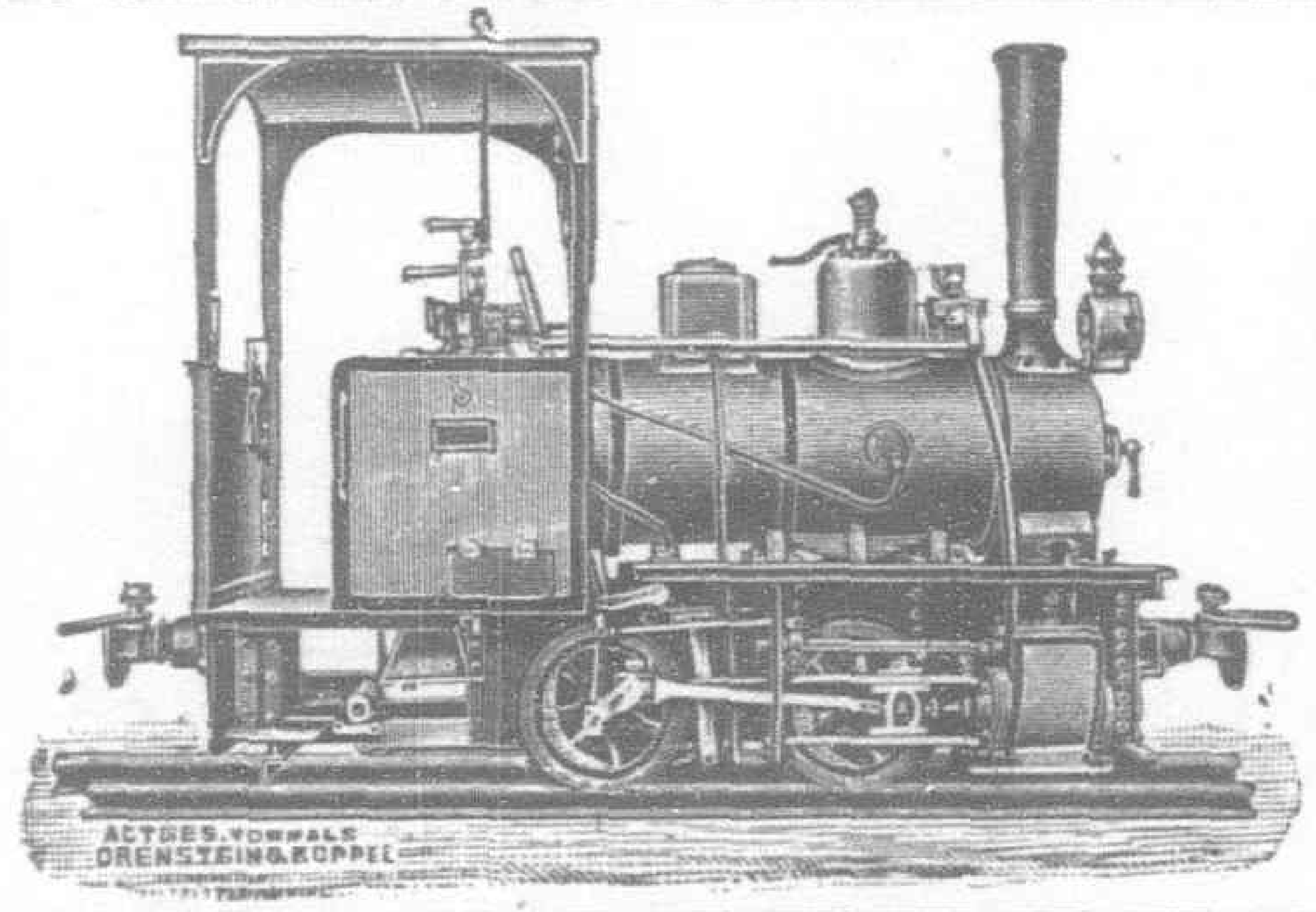

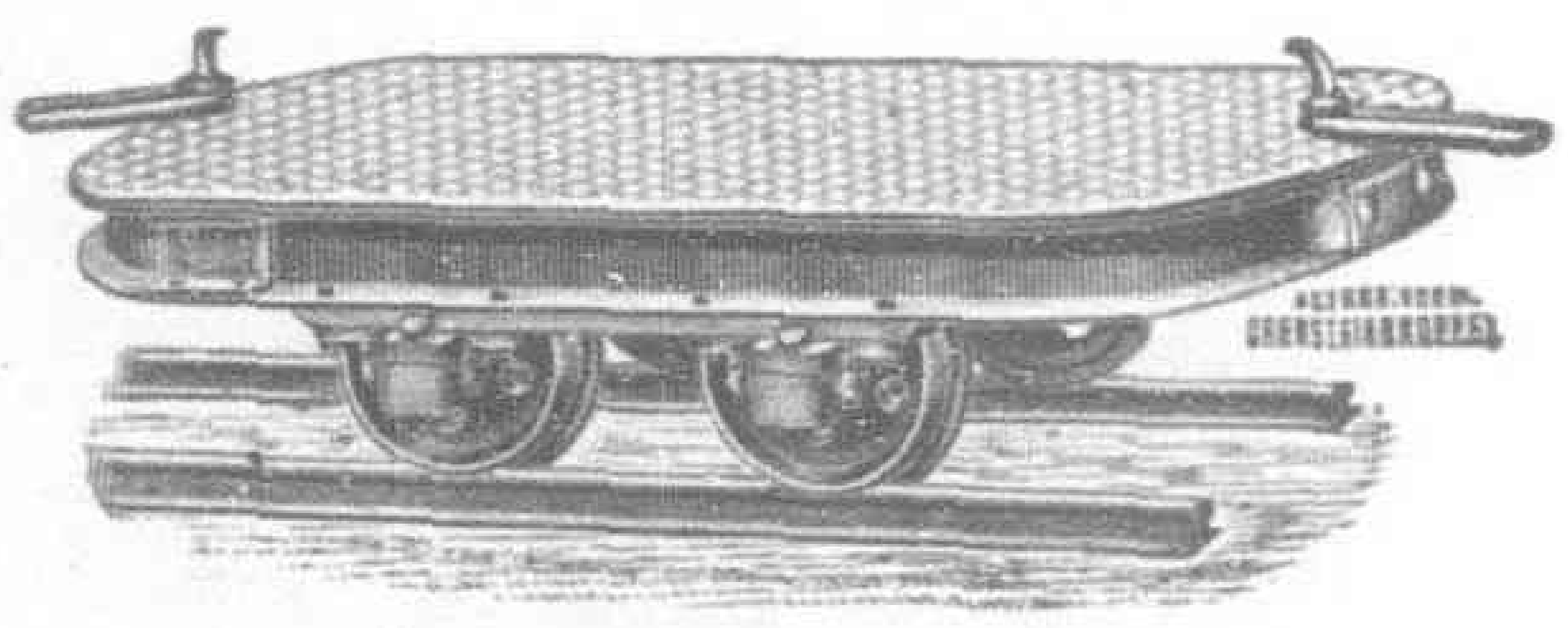

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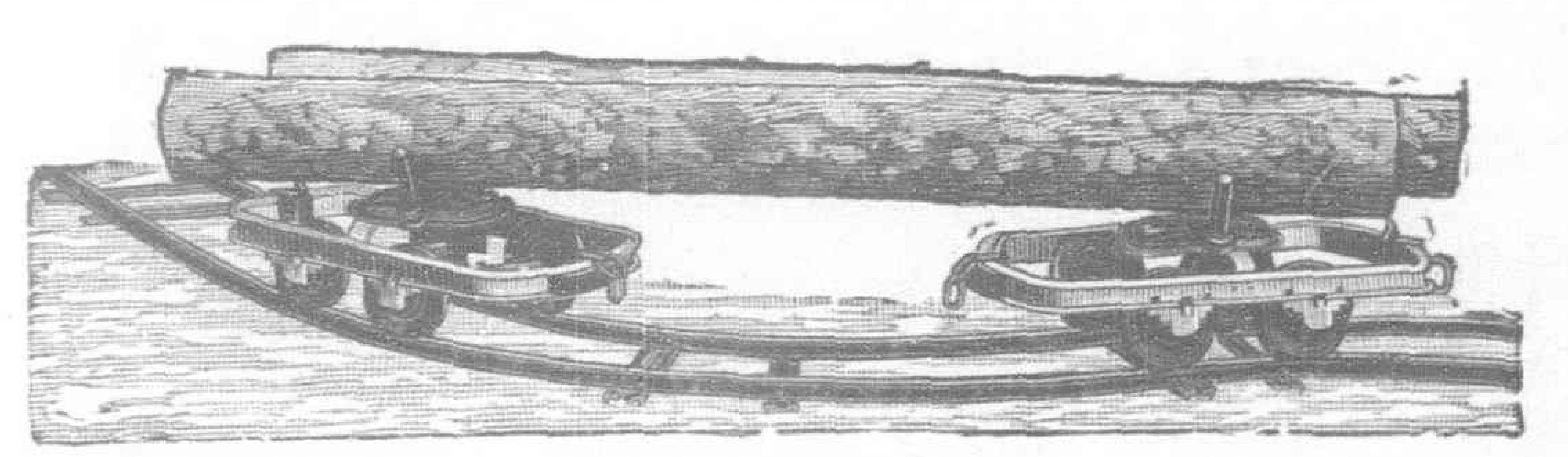

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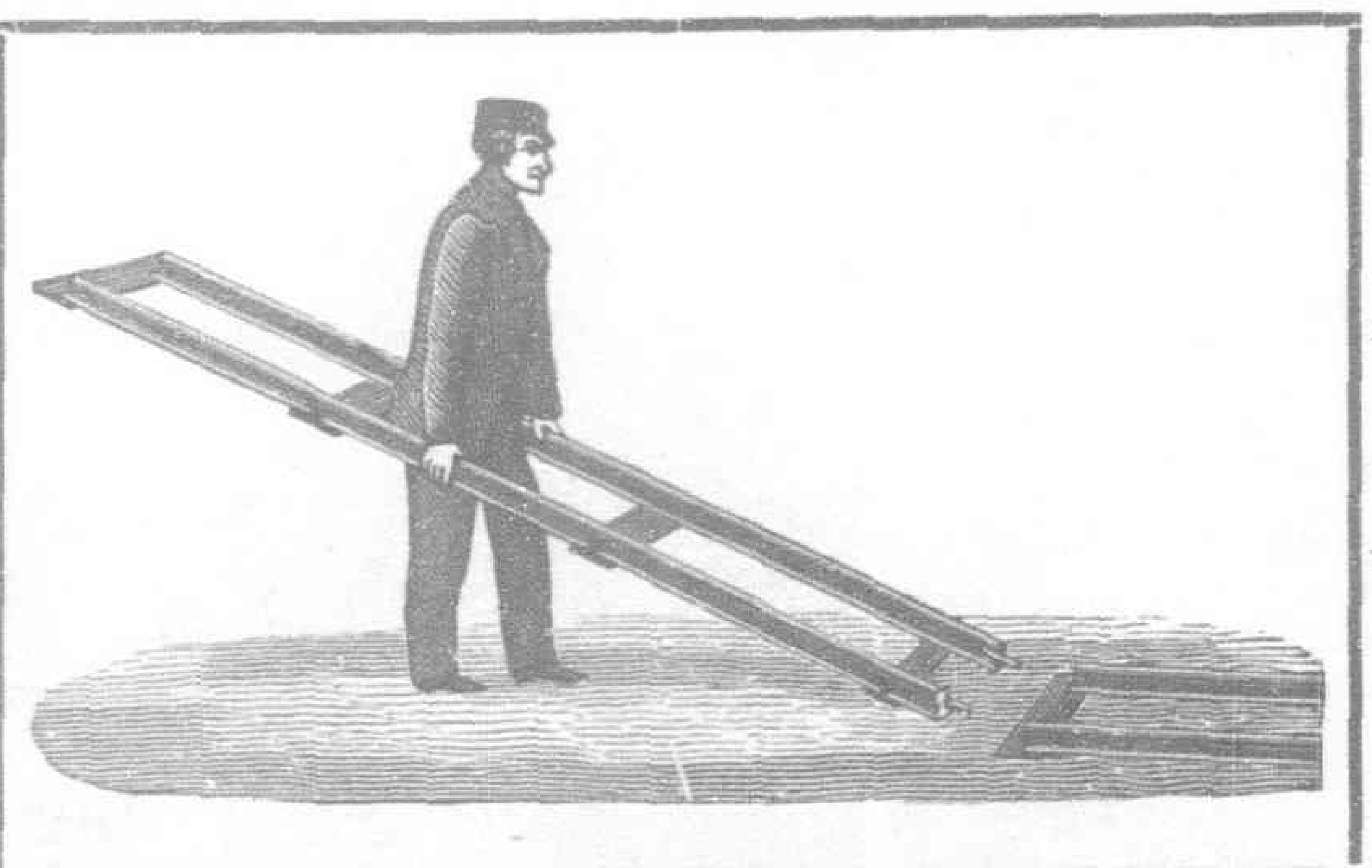

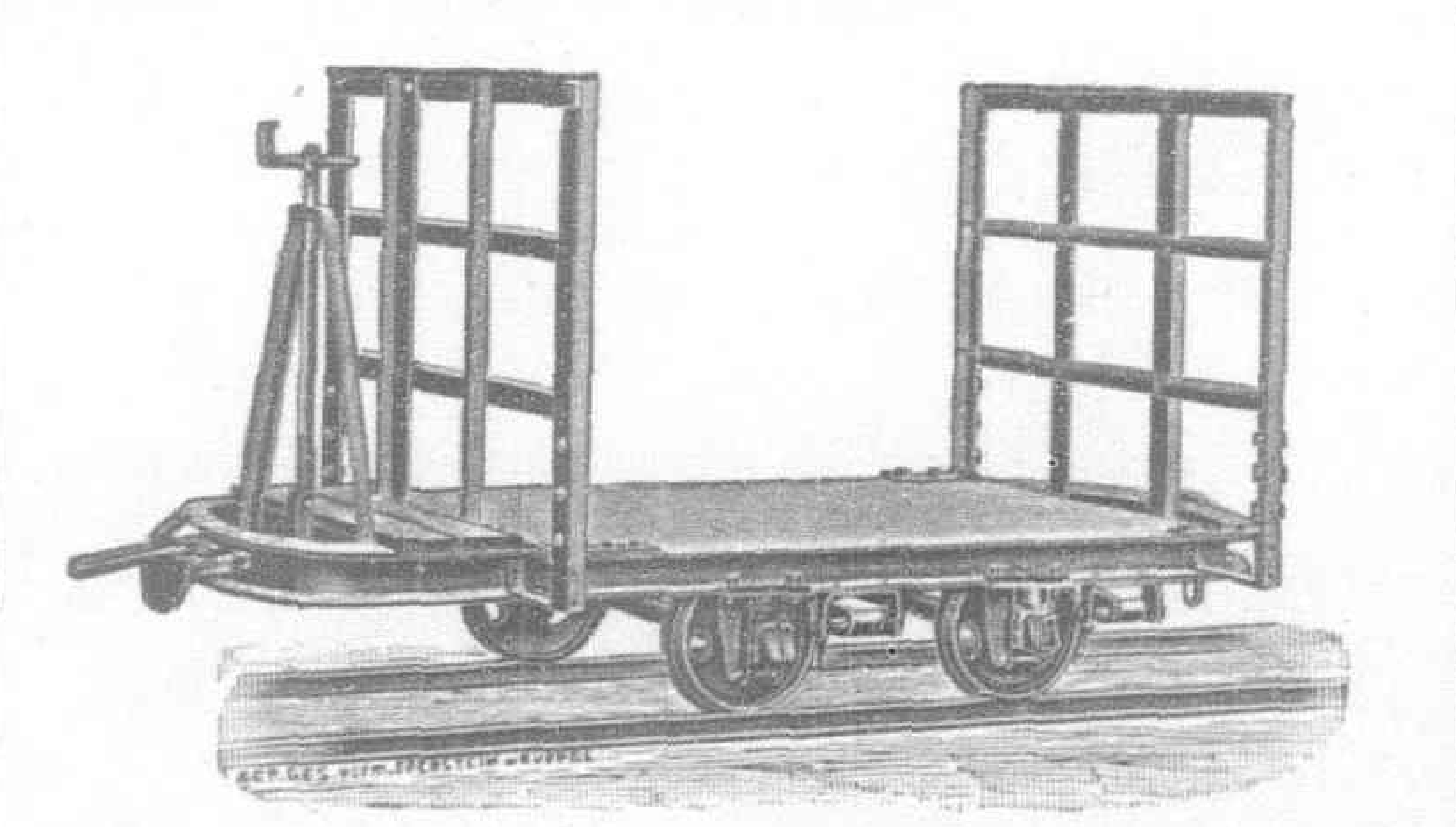

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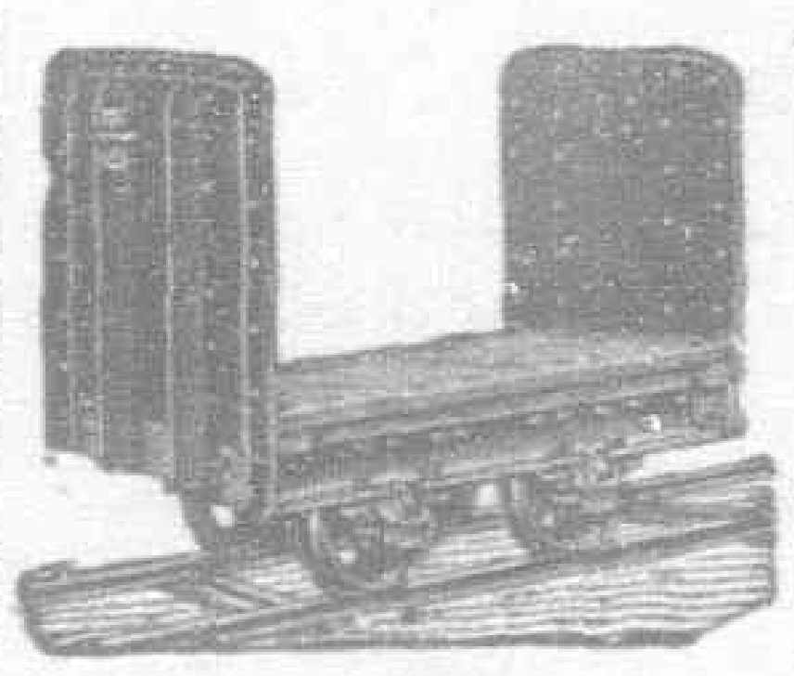

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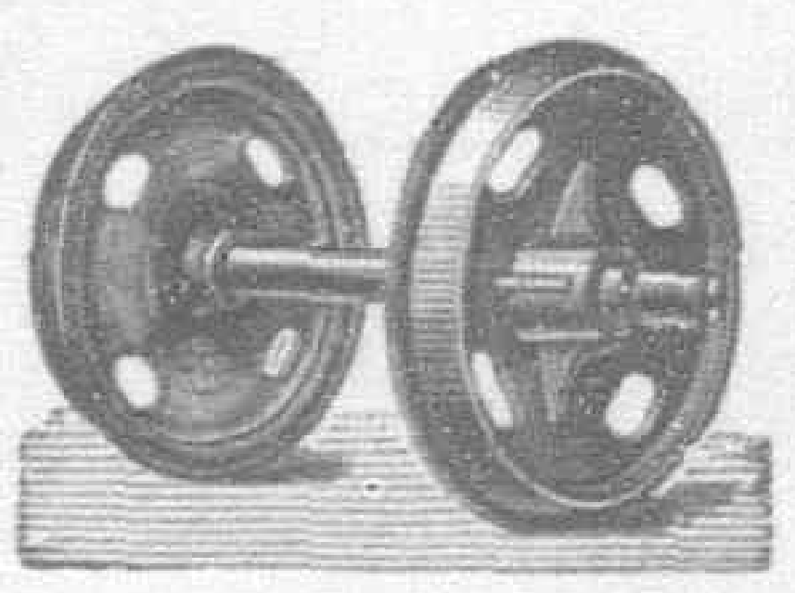

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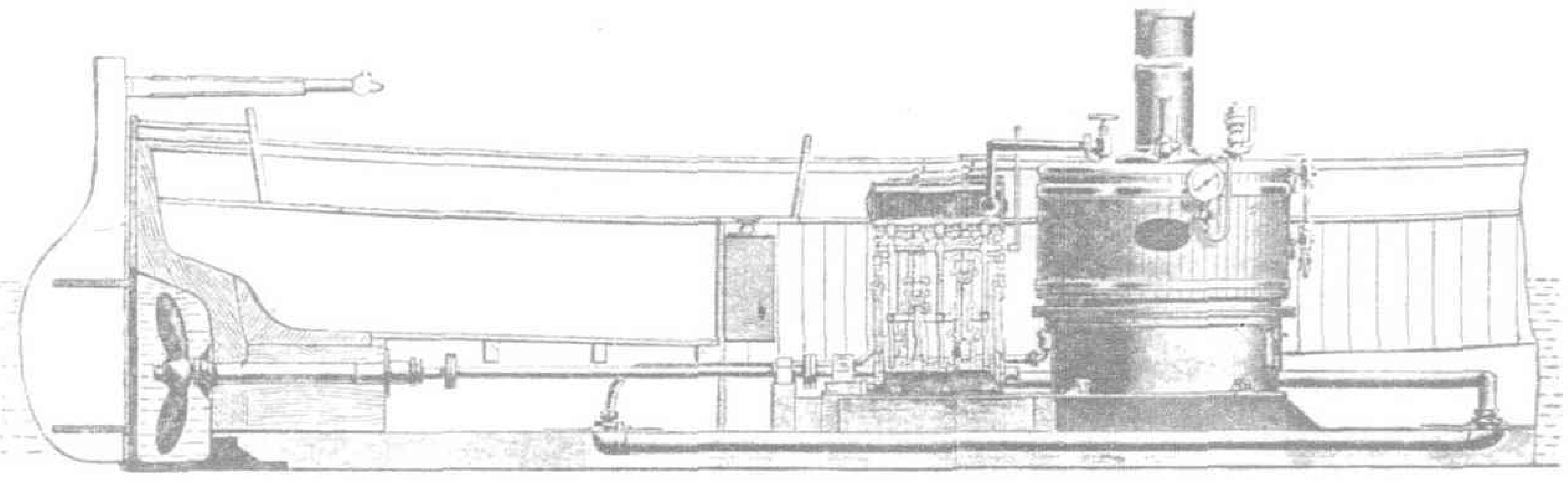

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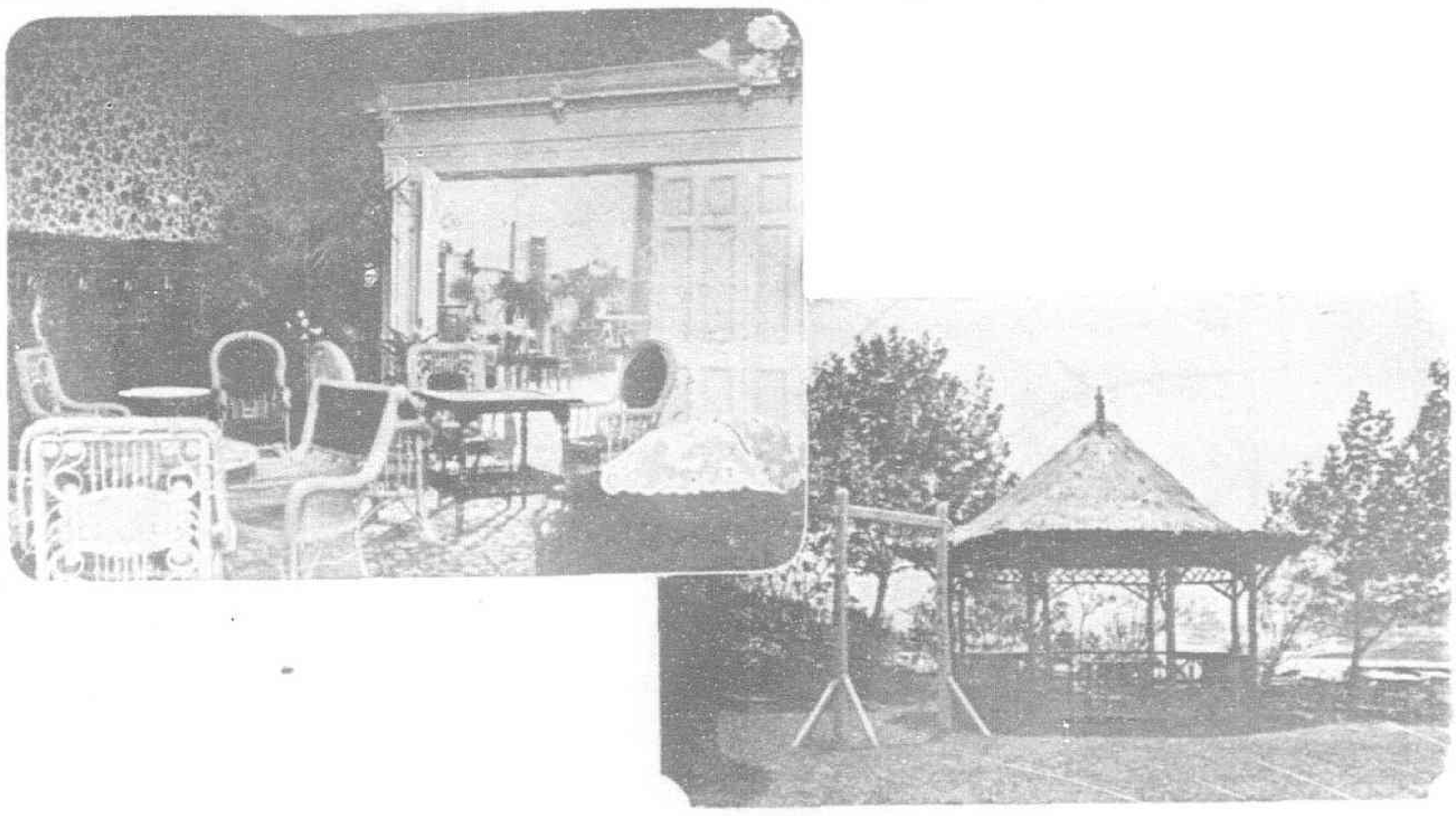

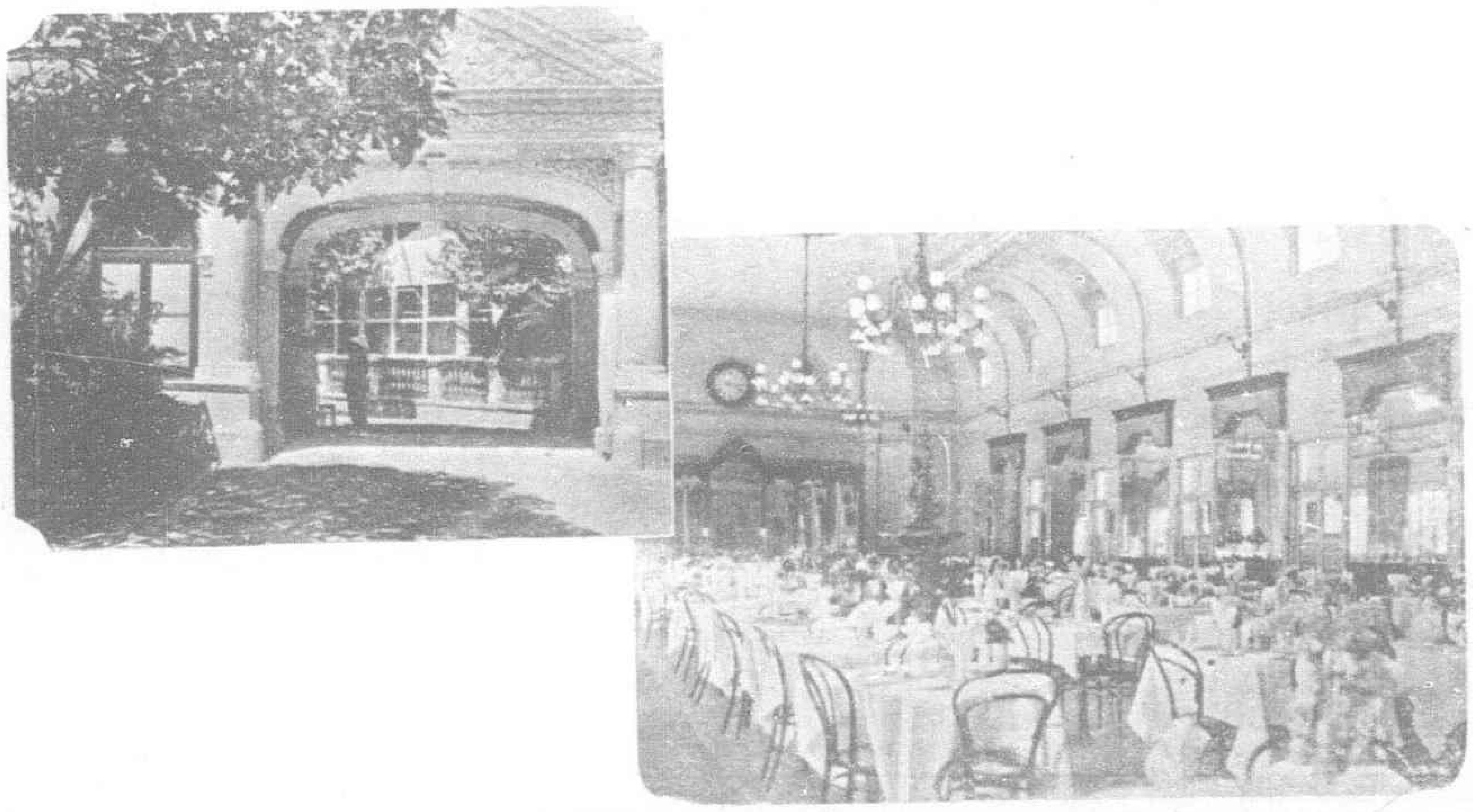

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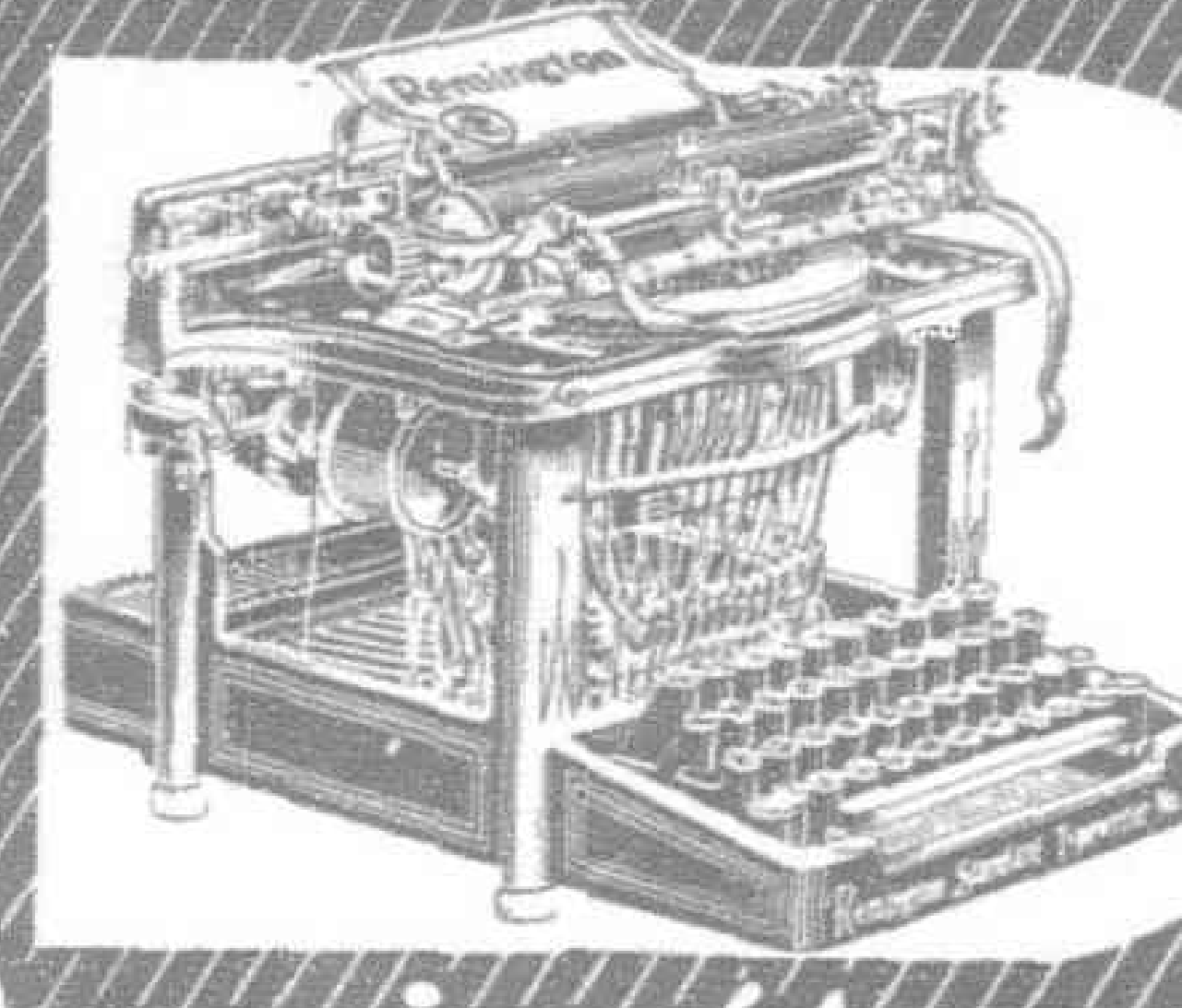

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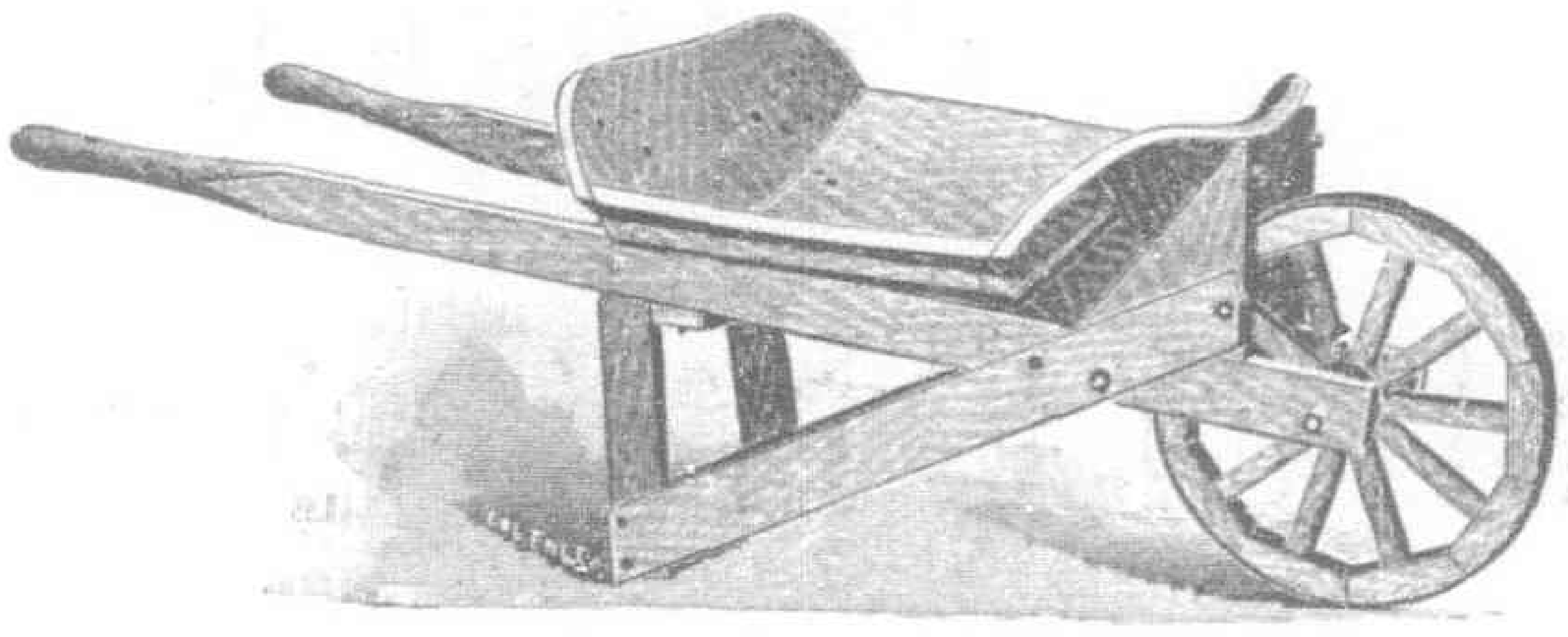

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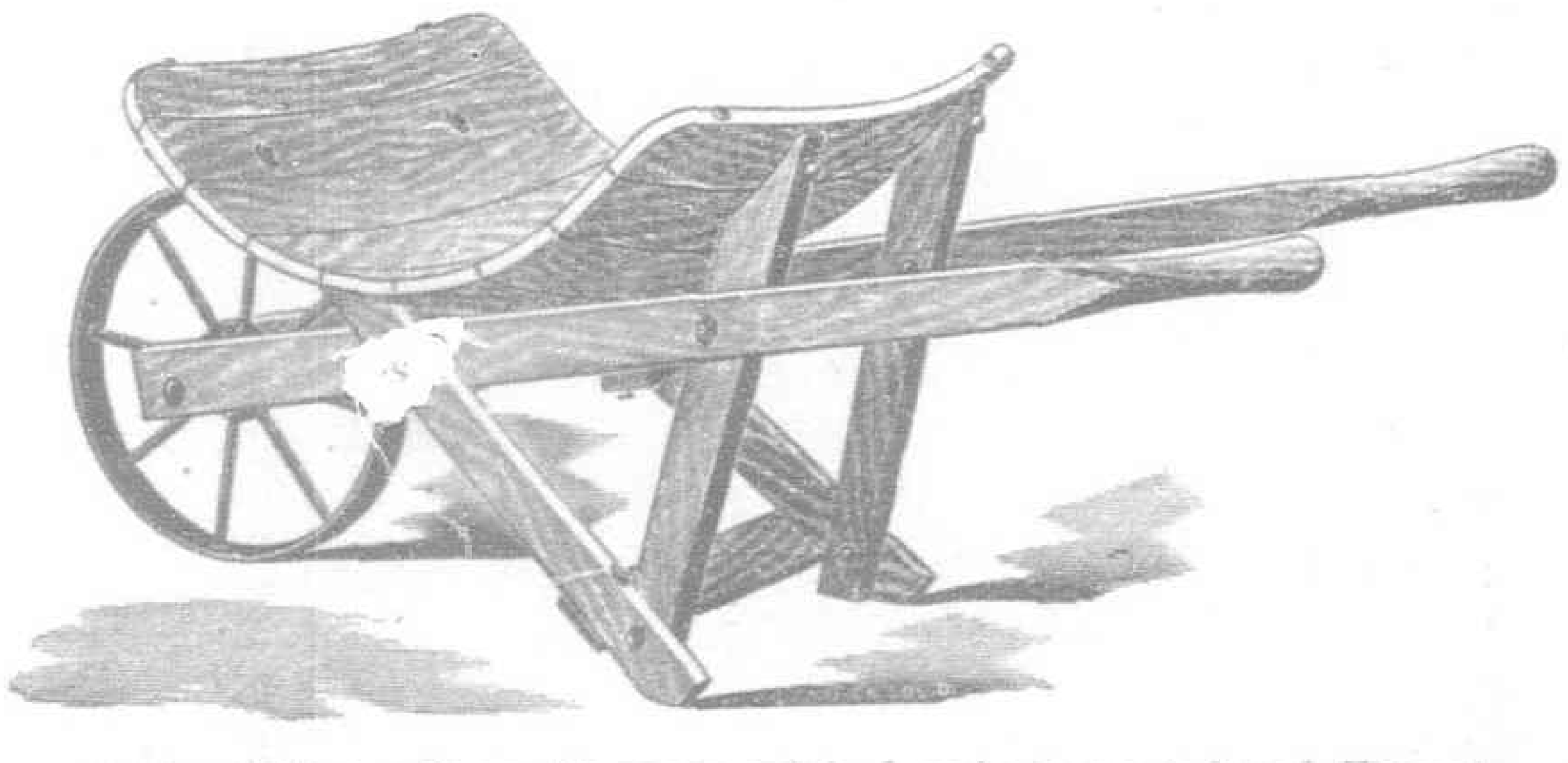

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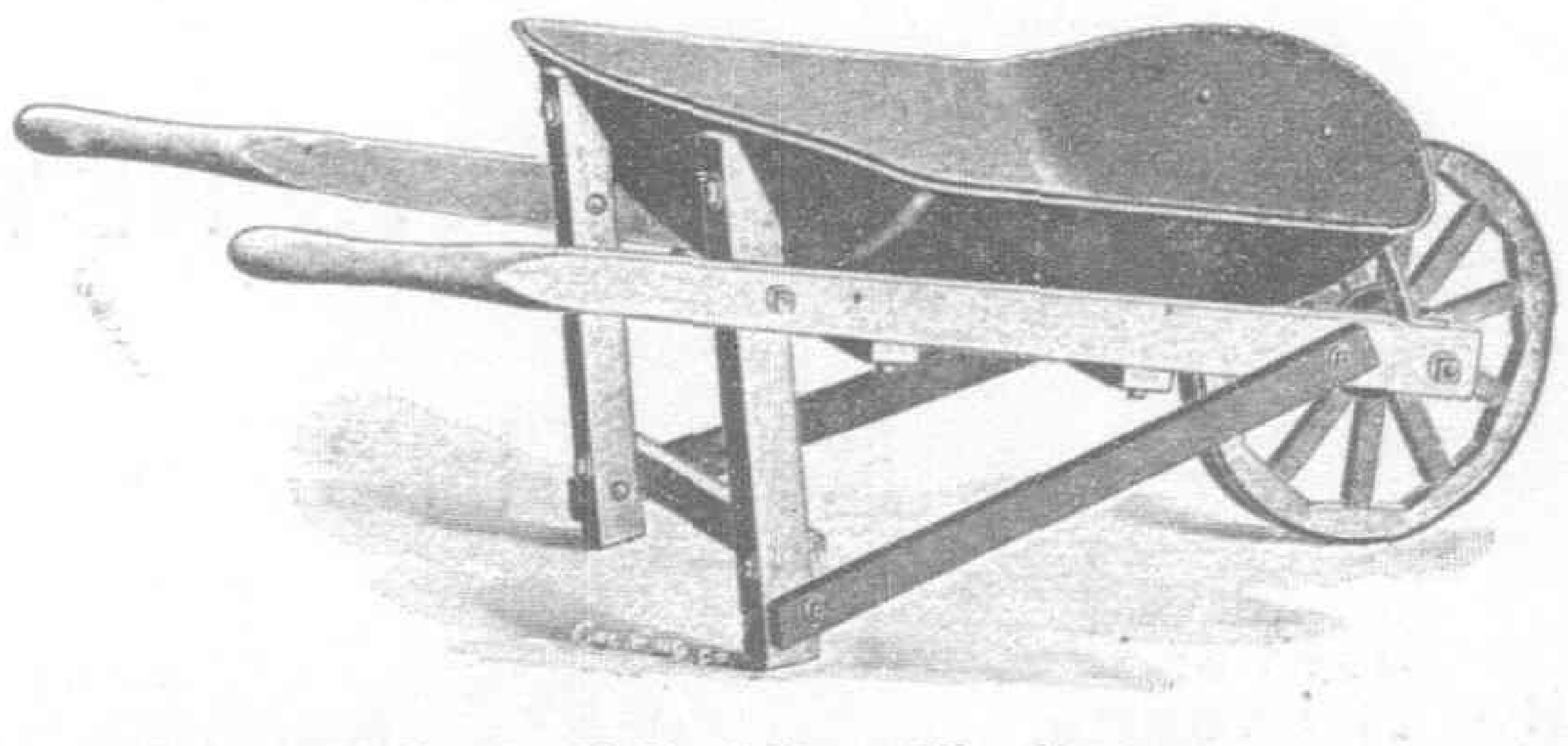

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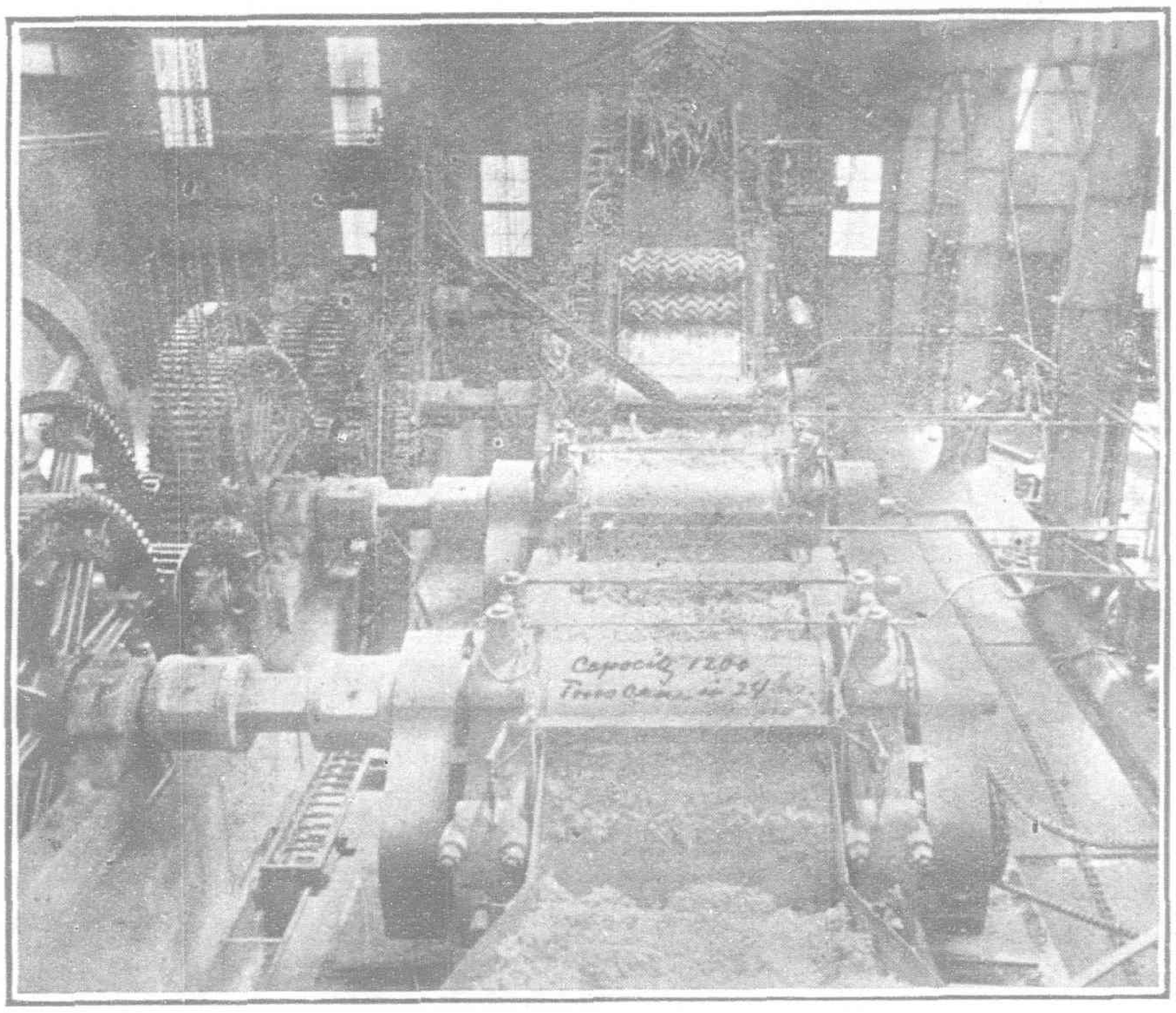

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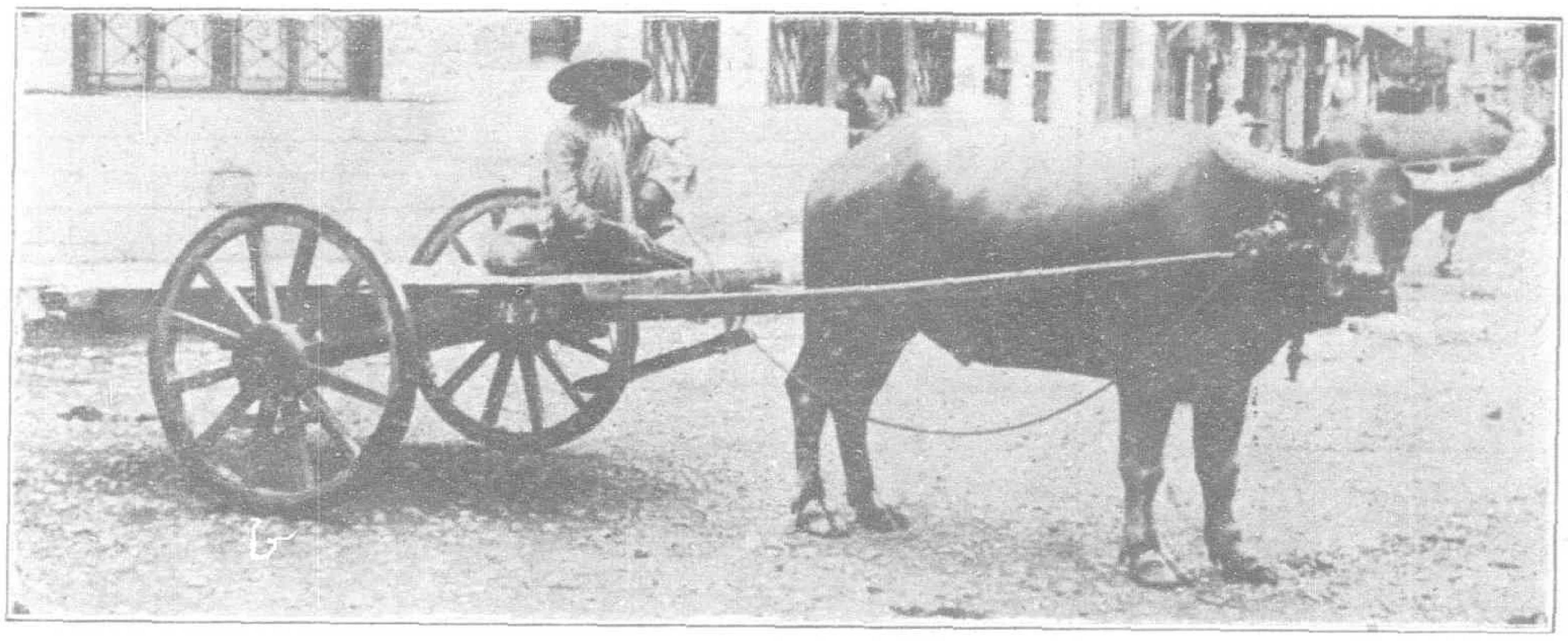

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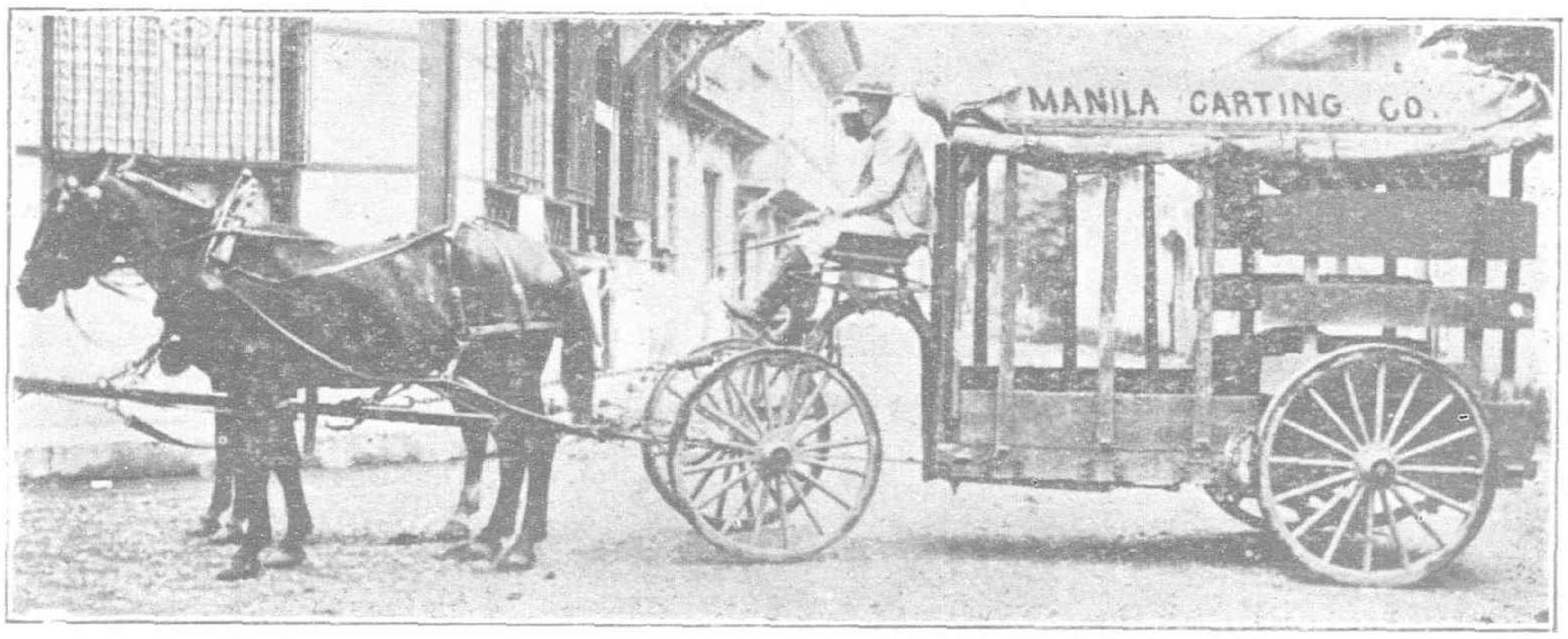

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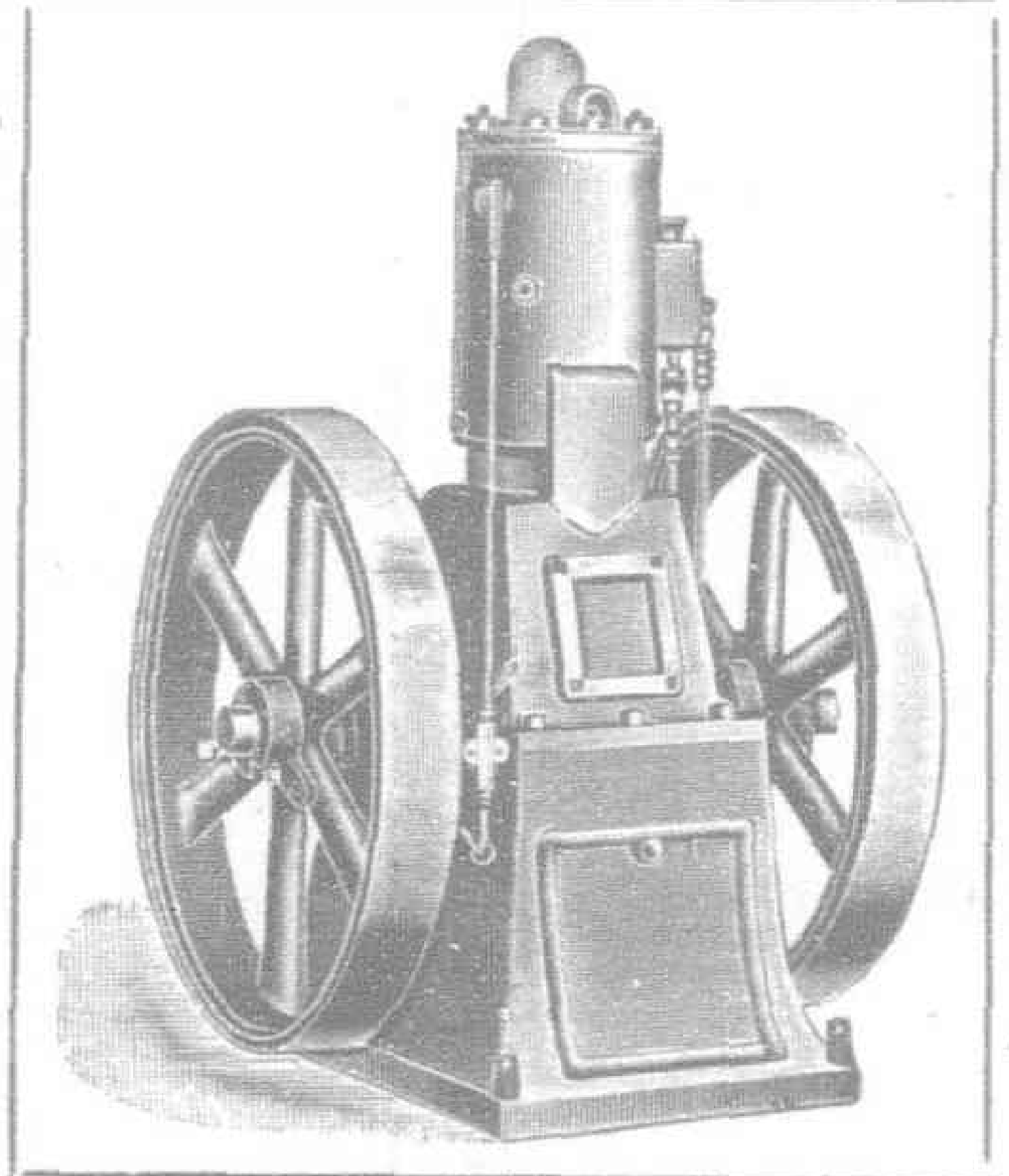

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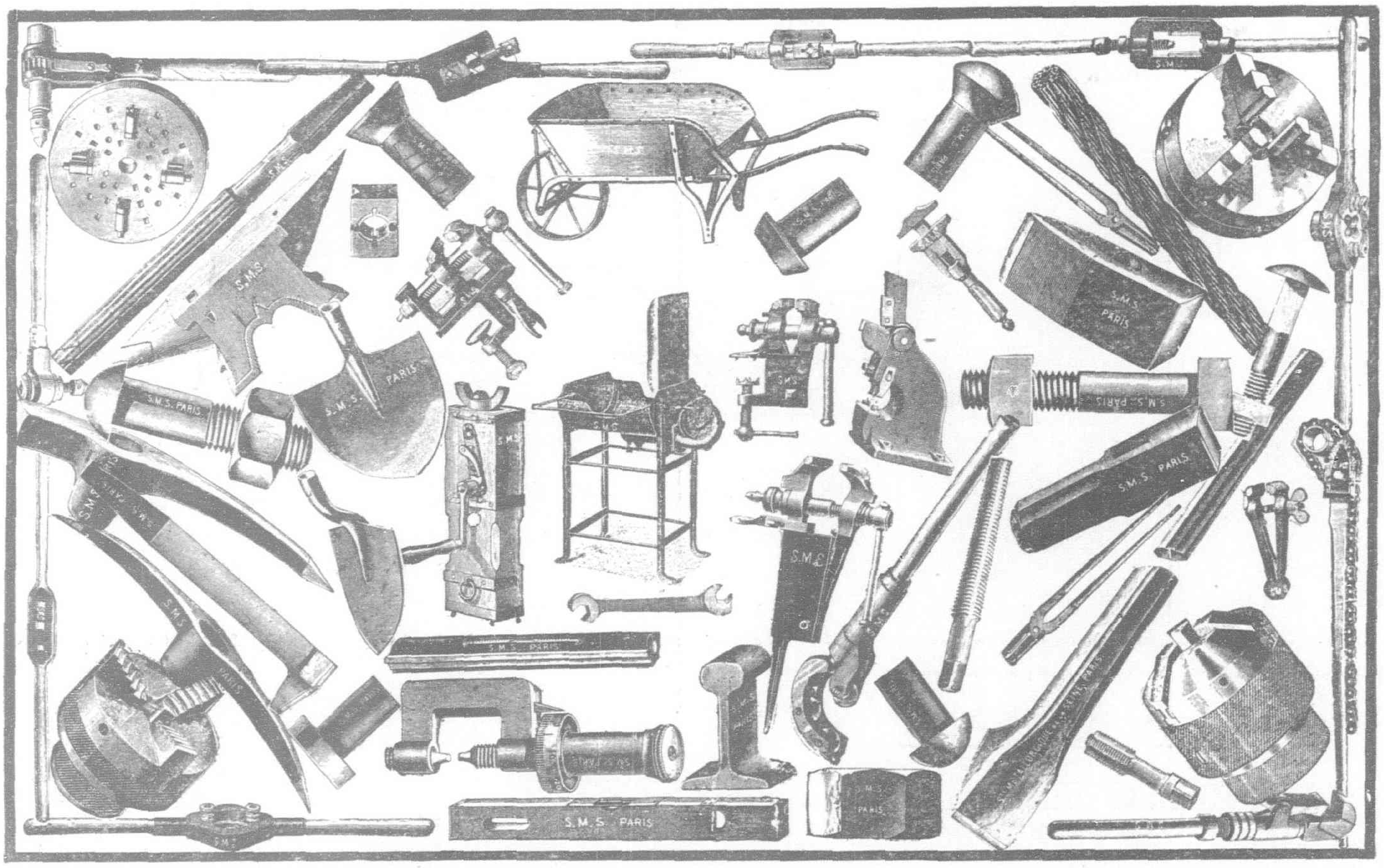

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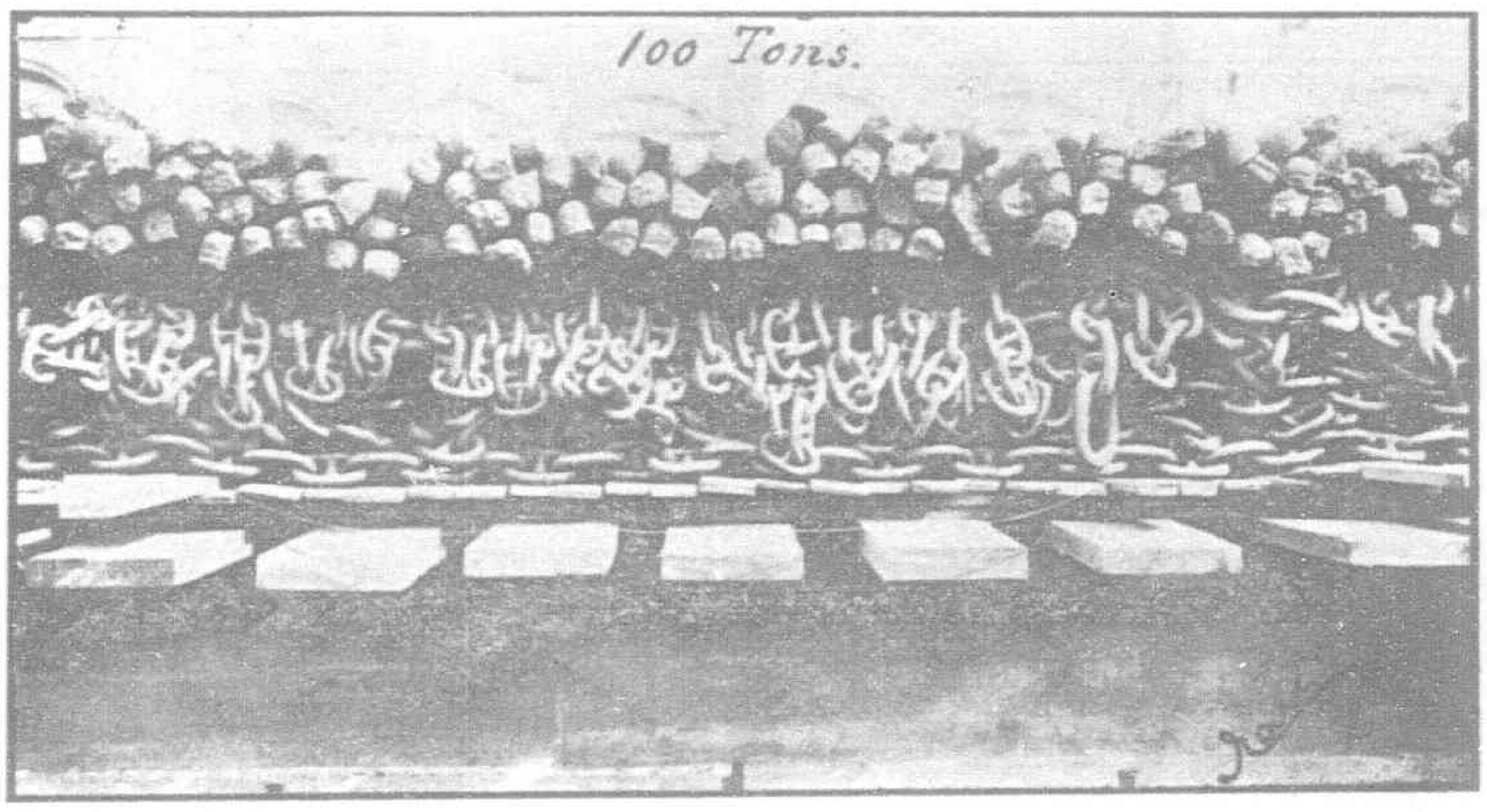

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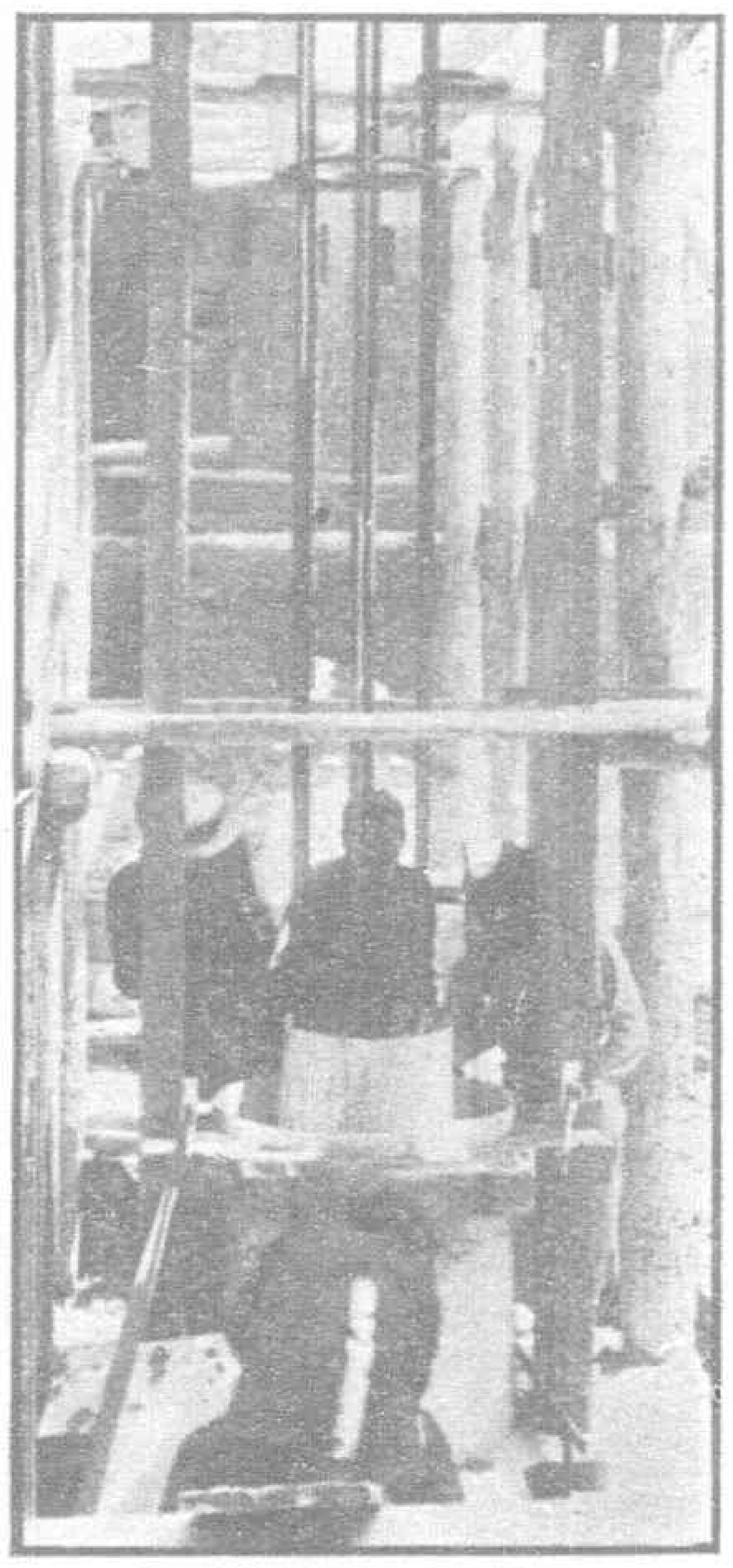

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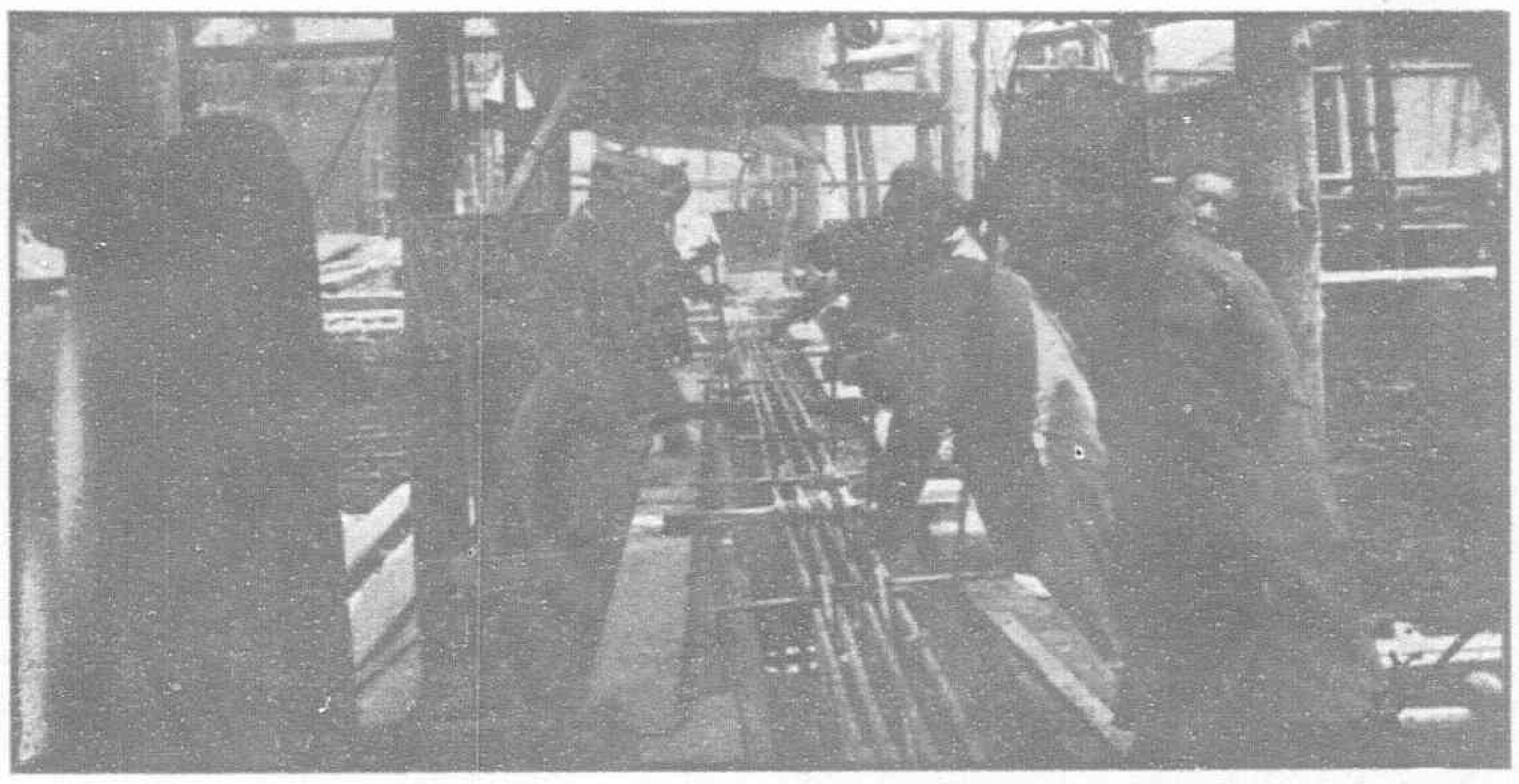

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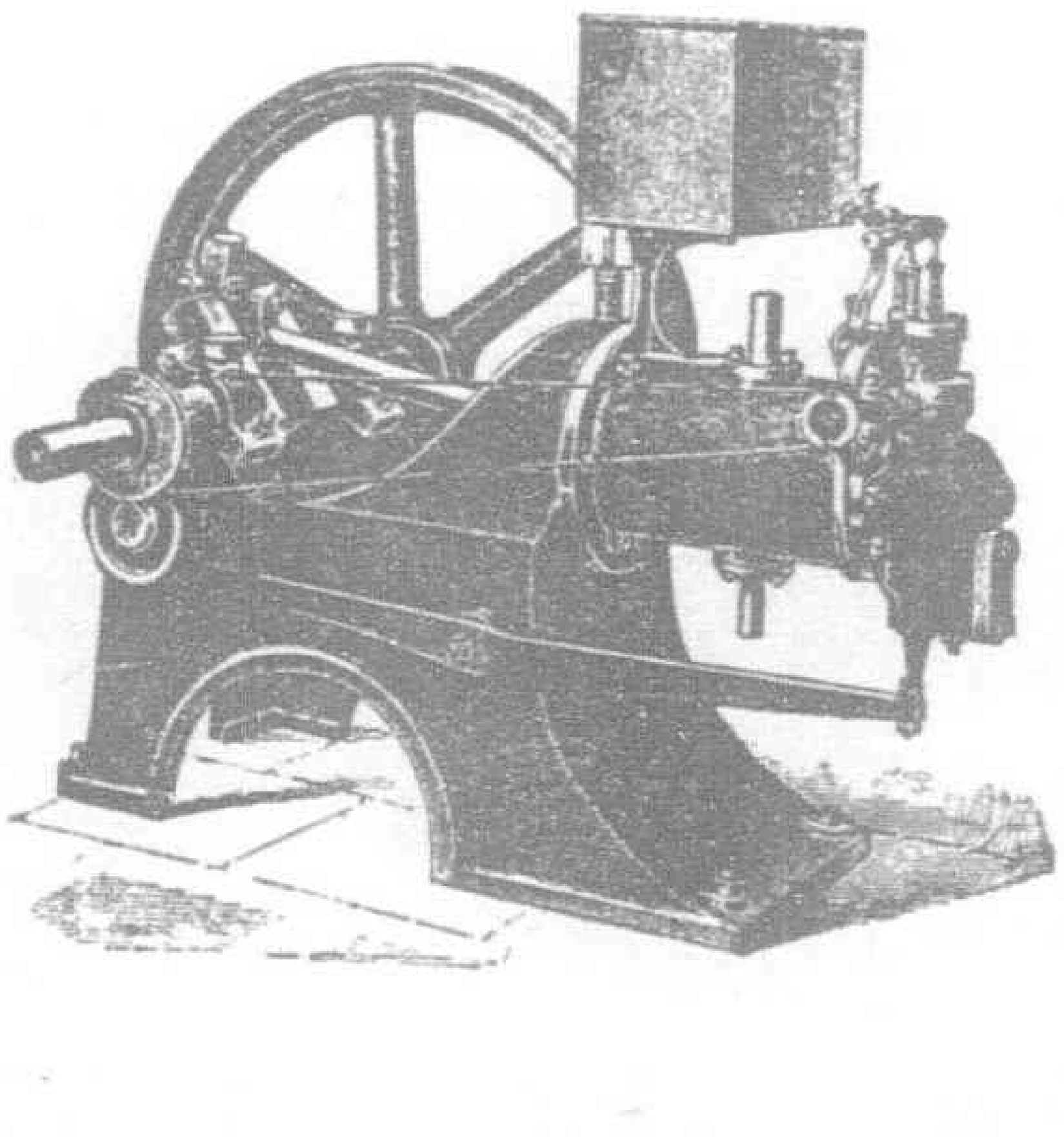

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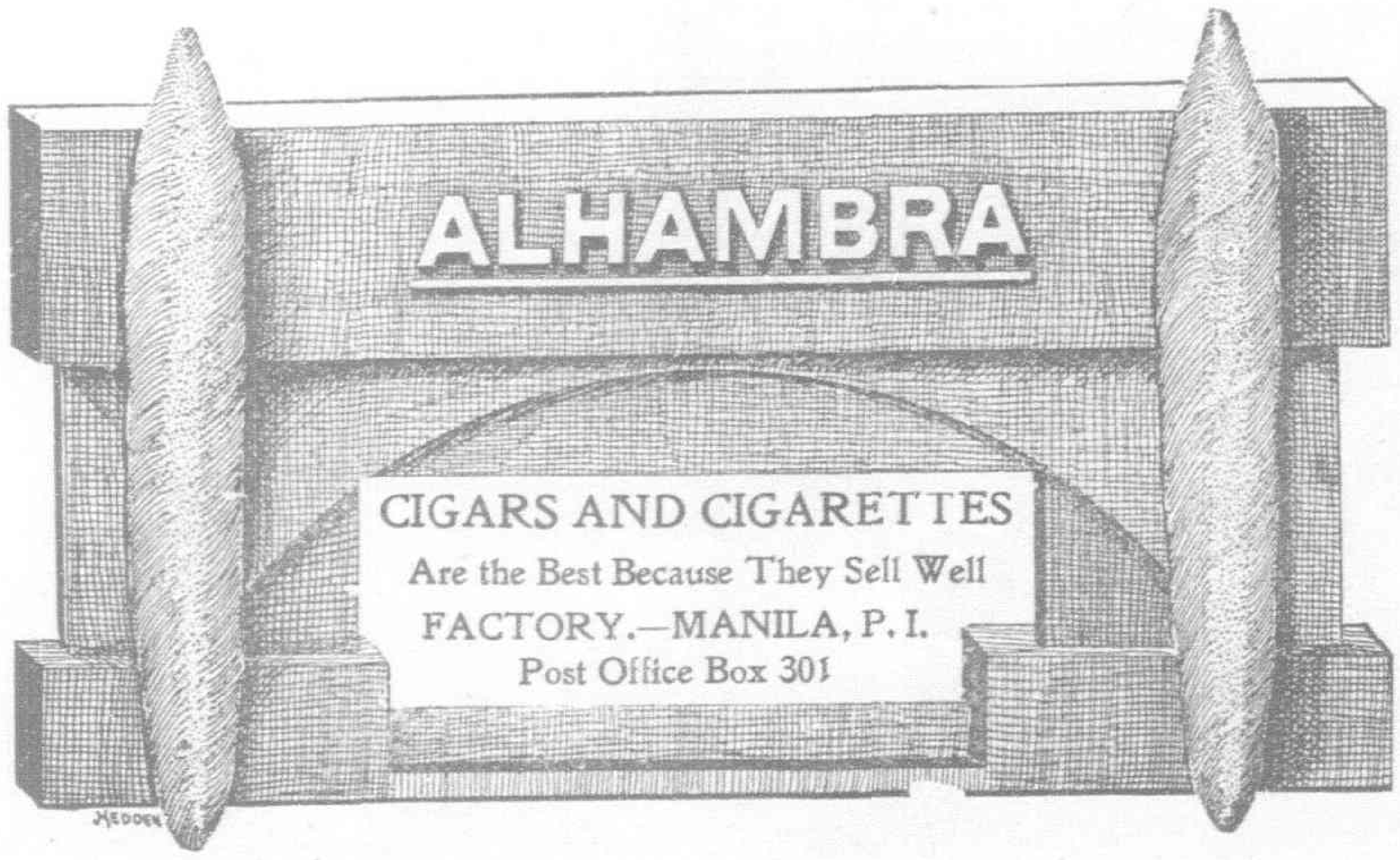

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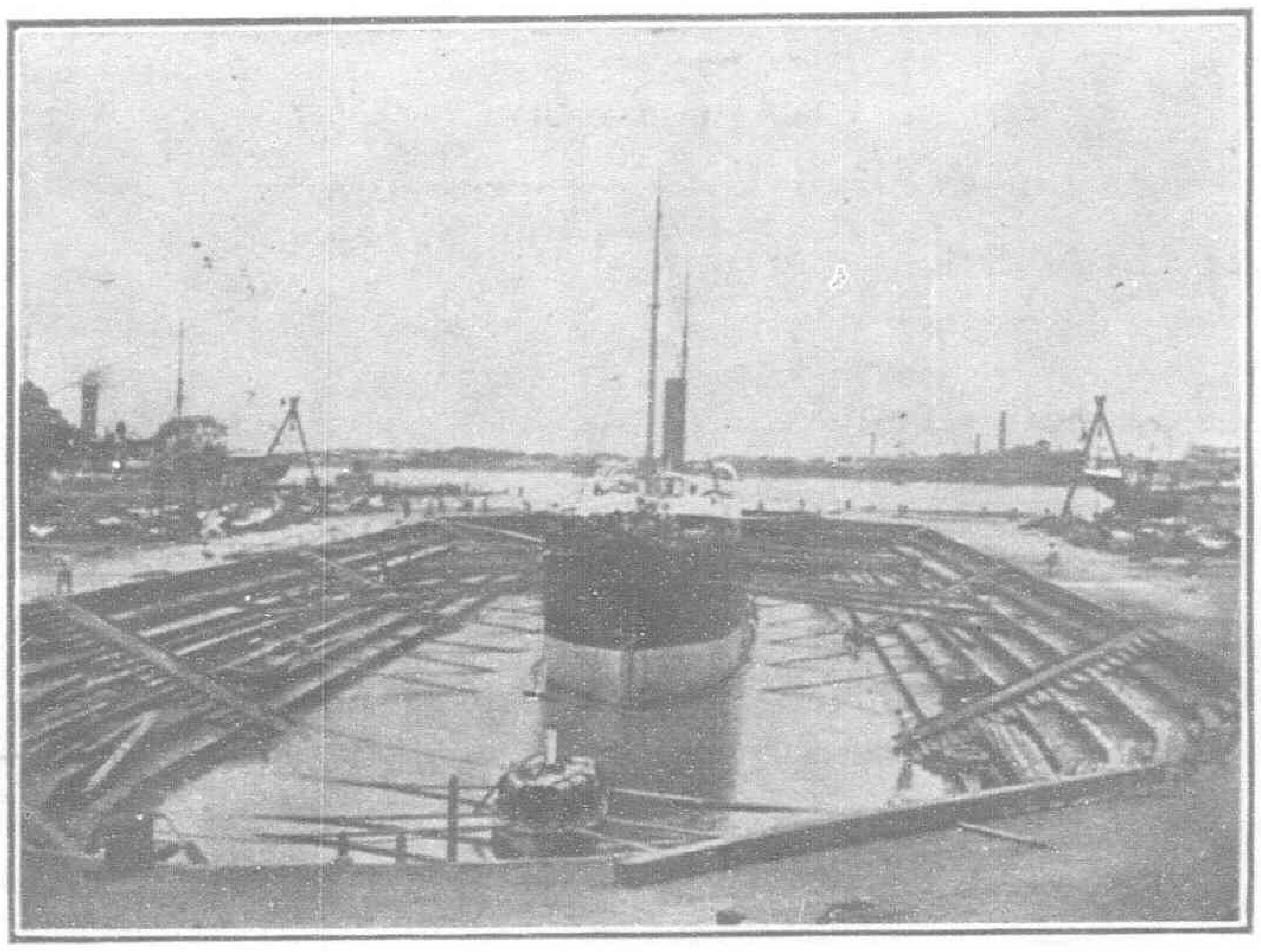

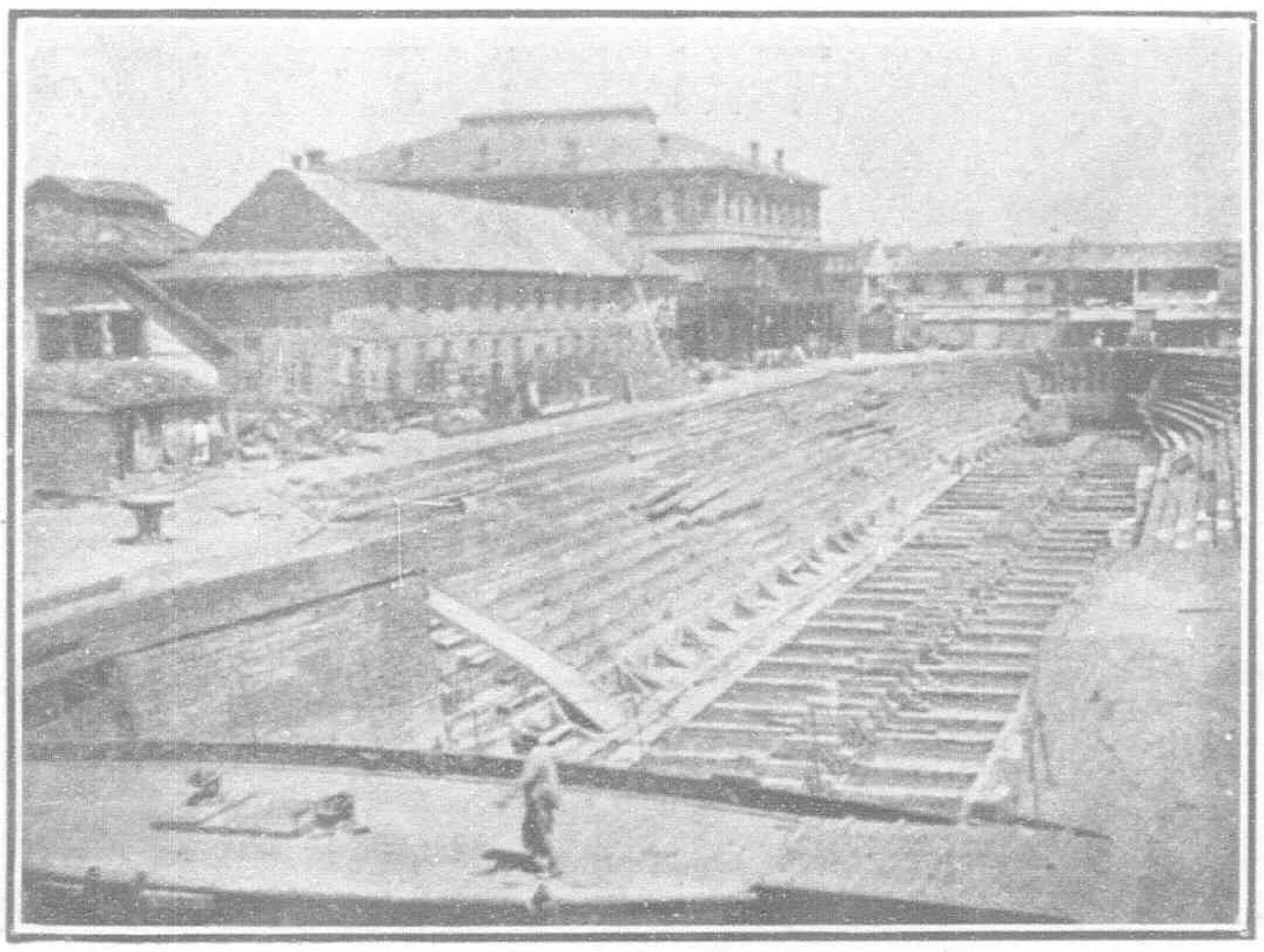

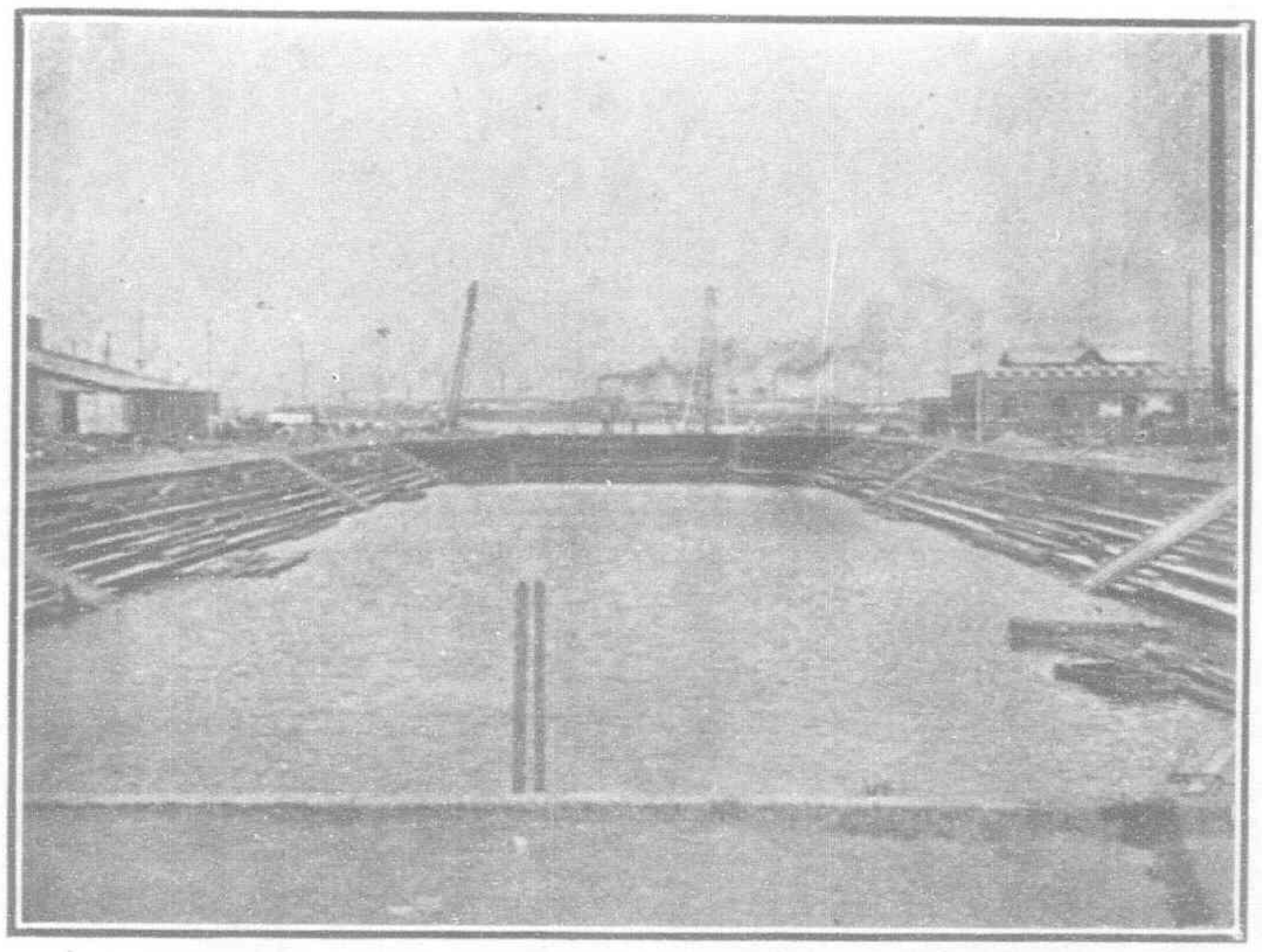

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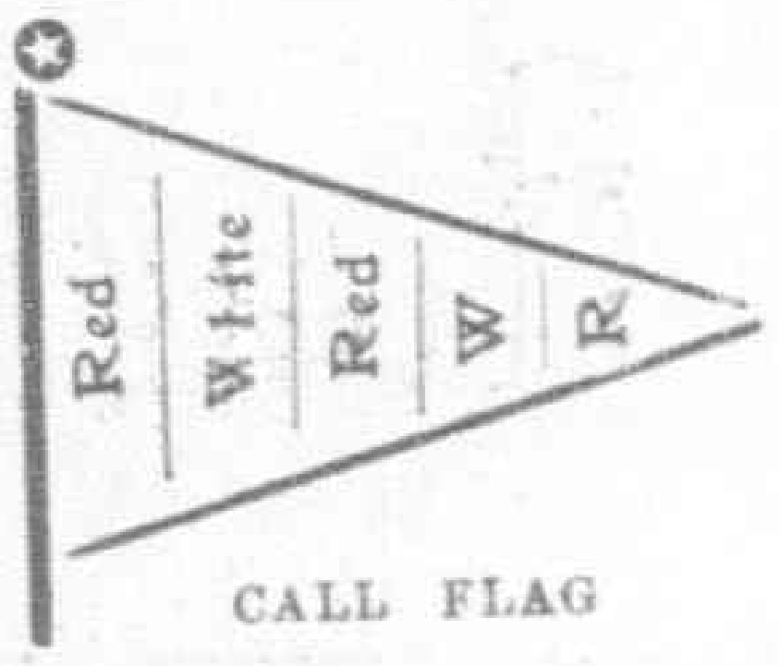

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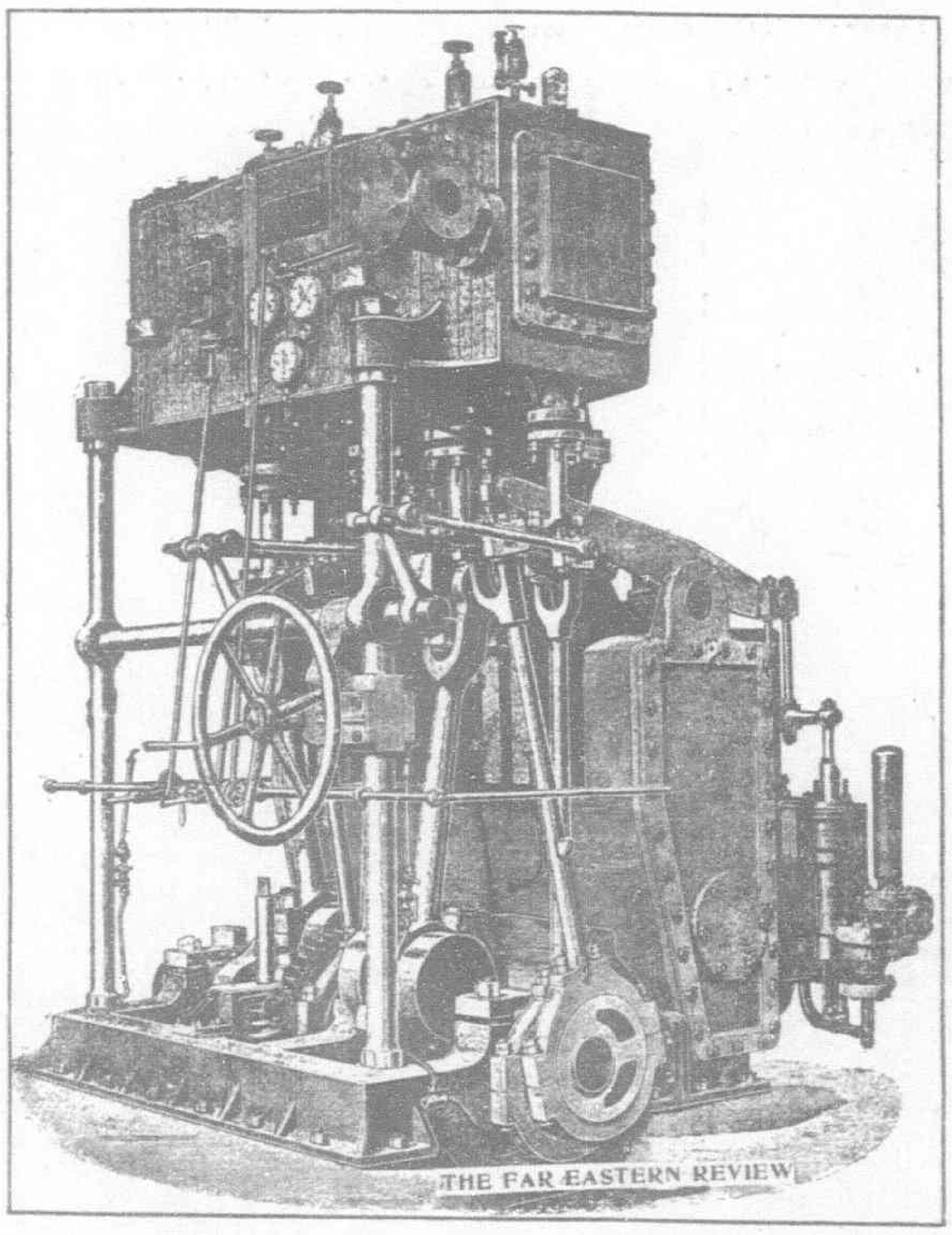

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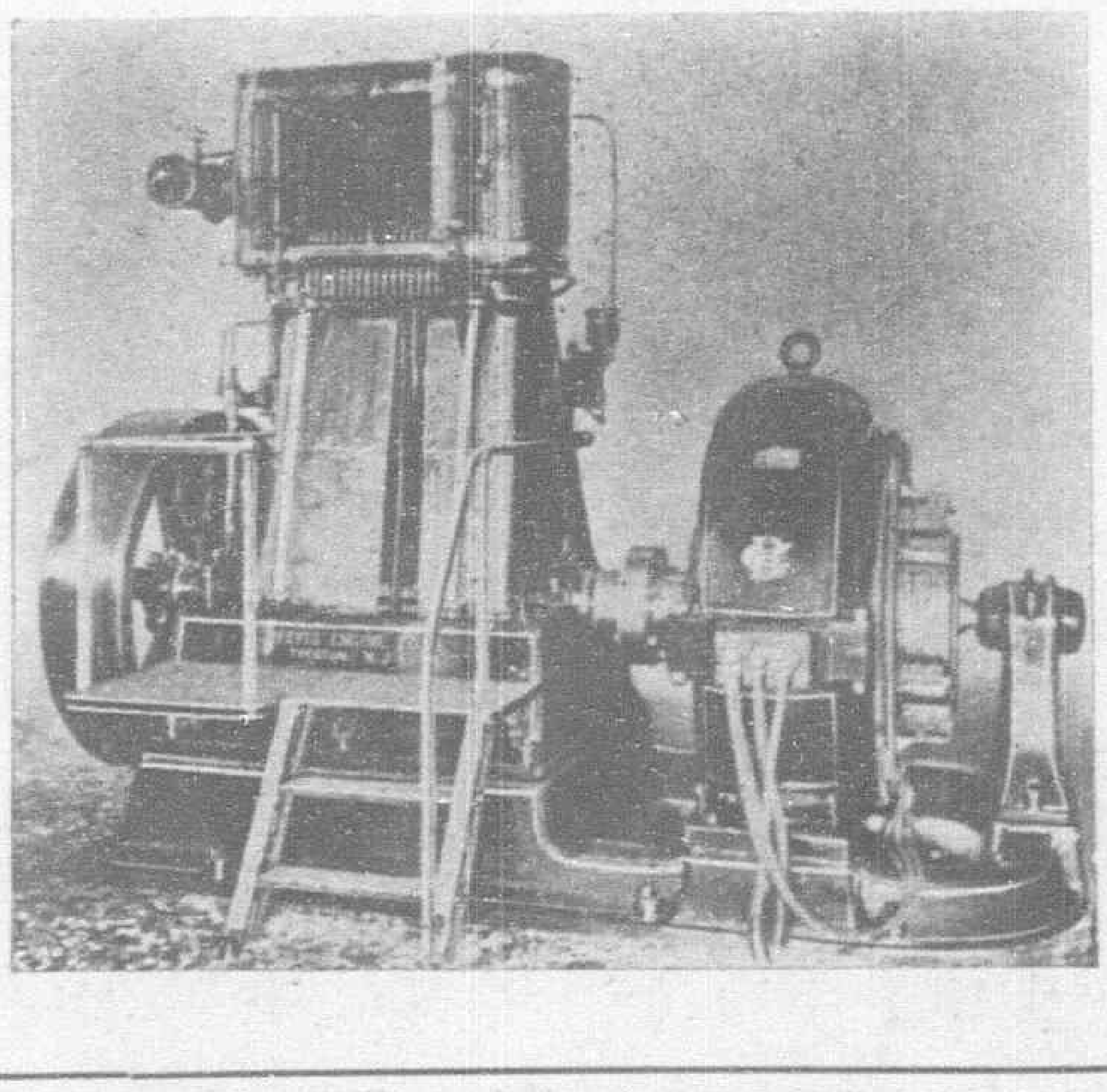

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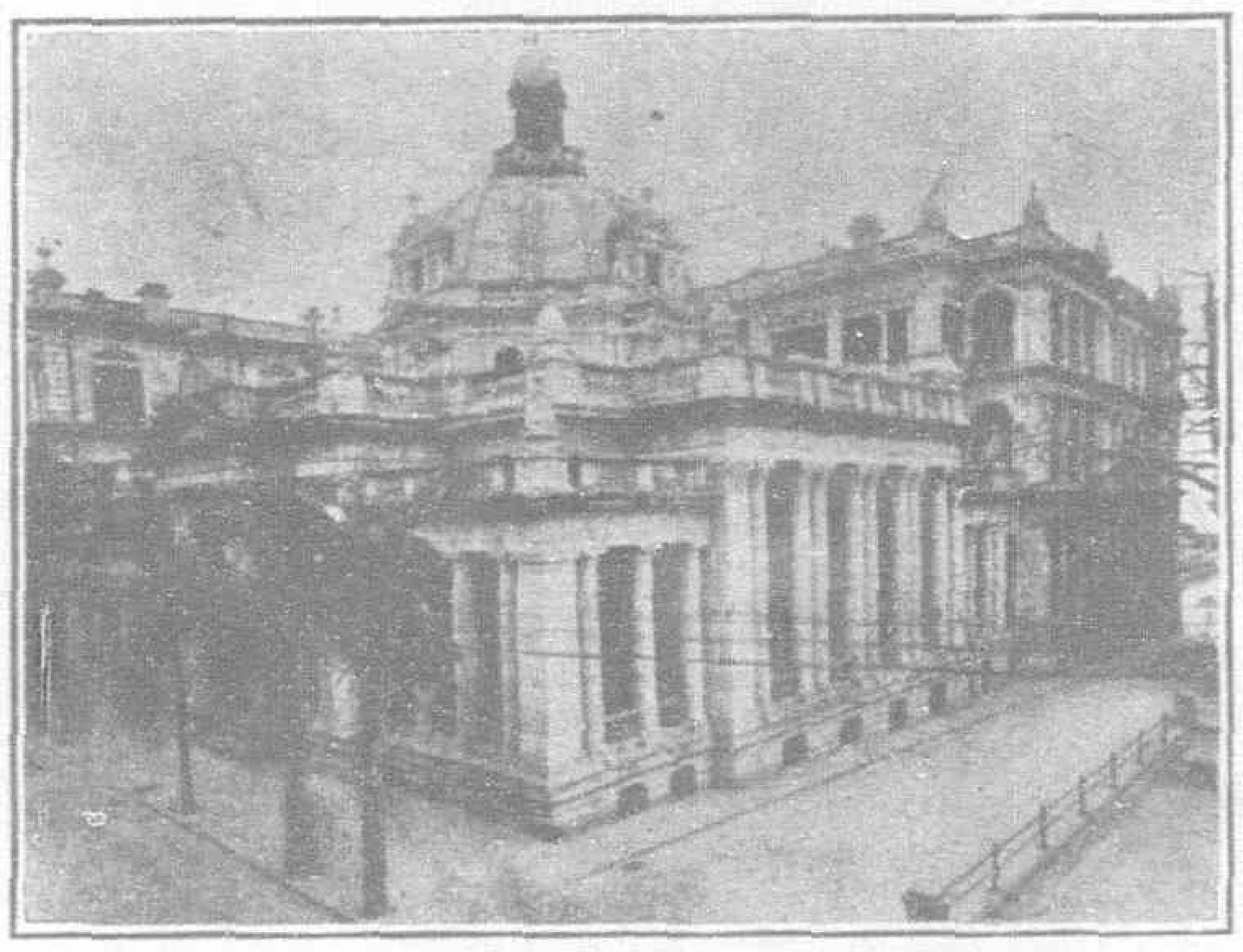

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